Working Document to WGBIOP, Malaga (Spain) September 2015

Otolith Exchange Results

Of European Anchovy (*Engraulis encrasicolus*) 2014

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CONTENTS

1. INTRODUCTION

European anchovy (*Engraulis encrasicolus*) is a small pelagic species of high commercial importance in European waters, in both the Atlantic and the Mediterranean Sea.

Ages reading on anchovy are important input data for the assessment and carried out by number of laboratories using international ageing criteria. The report on the latest workshop on age reading of European anchovy (WKARA, ICES 2009) stated that the frequency of workshops and exchanges on age reading of anchovy in the past had been good for Atlantic areas (mainly for the Bay of Biscay), and had been very poor for the Mediterranean areas. As well as for the Bay of Biscay have been many exchanges and workshops since the 90s (Astudillo et al 1990; Villamor and Uriarte, 1996; Uriarte, 2002a; Uriarte et al., 2002, 2006 and 2007), and the Gulf of Cadiz (Garcia, 1998; Uriarte et al., 2002), only one has been done for the Mediterranean areas (ICES, 2009). In this latter was the first time that anchovy otoliths of Atlantic and Mediterranean were included together. All workshops discussed and made an effort to standardize age reading methods by preparing a manual and a reference collection of agreed age otoliths.

The overall result of the last exchange and workshop exercise in 2009 was that there were significant variations in anchovy age estimates between readers and areas. Low precision, and large relative biases between readers and areas were found. Most of the anchovy otoliths were not well classified by most of the readers during the 2009 exchange, excluding the results of the readers of the Bay of Biscay (BB readers), which seem to be satisfactory. Possibly the success of the readers of the Bay of Biscay set, compared with the other sets, is because exchanges and workshops have been conducted since 1990 in this area, and there are sufficient criteria for the interpretation of anchovy otoliths. Following these findings all participants in the workshop agreed to follow the guidelines of the WKARA report for the decided upcoming exchange of images to facilitate an evaluation of the guidelines.

The Planning Group on Commercial Catch, Discards and Biological Sampling (PGCCDBS, ICES 2014a) indicated that an otolith exchange on anchovy should be organized in 2014, in order to ascertain the current level of precision among institutes and the difficulties that the age reading of anchovy otoliths present. This report represents the results of this exchange summarizing the readings of 18 readers of 10 European laboratories in five countries. The exchange was carried out from November 2014 to March 2015, organized by IEO and AZTI (Spain).

Objectives

The exchange has been the following common objectives for all areas, from Atlantic and Mediterranean areas (Although the analysis was done separately by areas):

1- Evaluate the current precision in otolith age reading of anchovy among readers of fishery and surveys samples throughout the year.
2- Identify major difficulties in anchovy otolith interpretation for age determinations concerning observed disagreements (otolith edge recognition and/or identification of true rings or checks).
3- Report results to the WGBIOP that will take place in September 2015.

2. MATERIAL AND METHODS

A questionnaire was distributed among anchovy aging institutes before the exchange to get an overview of potential participants and methods used and also information of anchovy stocks in different areas (biology, fisheries, etc) (Table 2.1). Table 2.2 shows the participating countries, institutes and participant names.

Table 2.3 shows readers which finally participated in the exchange, experience level in reading age of anchovies, as well as the area where they are readers. From all readers (18) nine readers have a long time experience to read anchovy otoliths (experts); one was intermediate and eight trainees. Table 2.3 also shows that stock/areas where readers are regularly involved in this activity and some of them are responsible for the preparation of anchovy age-length keys (ALK) used in stock assessment in their respective countries.

A set of altogether 576 images of anchovy otoliths were selected and uploaded for analyzing using the WebGR application (Web services for support of Growth and Reproduction Studies http://webgr.azti.es), distributed in 10 sets from different anchovy distribution areas (Figure 2.1). Table 2.4 shows the adopted sets of otoliths by stock/area and calibration exercise in WebGR and the number of anchovy otoliths used in this exchange including the sampling specifications.

A protocol and on age reading of anchovy was provided to all participants by uploading to WebGR (Villamor and Uriarte, 2014).

Age reading results were analyzed using the excel workbook “Age Reading Comparisons” (Eltink 2000) following the guidelines of the Planning Group for Commercial Catches, Discards and Biological Sampling for otolith exchanges (ICES 2014a).

Table 2.1. Information of Anchovy stocks/areas in Anchovy Exchange 2014.

Anchovy Stock	Area	Analitical Stock Assessment?	Organization/ Working Group	Countries involved/Institutes	Conventional birth dates	Season of fishery	Peak of catch	Spawning Season	Spawning peak	Season of recruitment at age 0
English Channel	ICES Subarea VII	No	ICES WGHANSA	England and France/CEFAS, IFREMER	1st of January	All year	-	-	-	-
Bay of Biscay	ICES Subarea VIII	Yes	ICES WGHANSA	France and Spain/IFREMER, AZTI and IEO	1st of January	March-November	April-June for Spain; June-September for France	April-August	May-June	Autumn (September-October)
Division IXa	ICES Division IXa	Not yet (trend-based qualitative assessment)	ICES WGHANSA	Portugal and Spain/IPMA and IEO	1st of January	February-November for Ixa South, Spain; Occasional for Portugal in IXA Cnorth, Csouth and South, and for Spain in Ixa North	June-July (IXA South, Spain); No peak for the rest of the areas.	April-November for Ixa South	June-July for Ixa South;	Autumn (September-November)
GSA01	Northern Alboran Sea	Yes	CGPM (WG small pelacic species)	Spain/IEO	1st of July	All year	Summer/Autumn	May-October	July	Autumn
GSA06	Western Mediterranean	Yes	CGPM (WG small pelacic species)	Spain/IEO	1st of July	All year	Summer	May-October	July	Autumn
GSA16	Strait of Sicily	Yes	CGPM (WG small pelacic species)	Italy/IAMC-CNR	1st of July	All year	Summer	May-October	July-August	Autumn (September-December)
GSA10	Southern Thyrrenian	No	-	Italy/COISPA	1st of July	Summer-Autumn	July	Spring	May-June	Summer and early autumn
GSA19	Western Ionian	Yes	STECF-14-08	Italy/COISPA	1st of July	Summer-Autumn	June	Spring	May-June	Summer and early autumn
GSA07	Gulf of Lion	Yes	CGPM (WG small pelacic species)	France/IFREMER	1st of January	All year	July	May-August	July	Autumn
GSA22	Aegean Sea	Yes	CGPM (WG small pelacic species)	Greece/ELGO	1st of June	March to November	July	Spring-Autumn	June-July	March

Table 2.2. Participants information in anchovy Exchange.

Country	Institute & postal address	Participants in exchange	Email	Readers or Not ?
Spain-IEO	Instituto Español de Oceanografia (IEO) Promontorio de San Martin s/n 39004 Santander (Cantabria) Spain	Begoña Villamor Clara Dueñas-Liaño Ana Antolinez Charo Navarro	begona.villamor@st.ieo.es clara.duenas@st.ieo.es ana.antolinez@st.ieo.es charo.navarro@st.ieo.es	No (Age coordinator) yes yes yes
	Instituto Español de Oceanografia (IEO) Puerto pesquero, Muelle de Levante s/n 11006 Cádiz Spain	Fernando Ramos Jorge Tornero	fernando.ramos@cd.ieo.es jorge.tornero@cd.ieo.es	No yes
	Instituto Español de Oceanografia (IEO) Puerto Pesquero s/n 29640 Fuengirola-Málaga Spain	Pedro Torres	pedro.torres@ma.ieo.es	yes
Spain-AZTI	Herrera Kaia - Portu aldea z/g 20110 Pasaia - Gipuzkoa Basque Country Spain	Andrés Uriarte Iñaki Rico Beatriz Beldarrain	auriarte@azti.es irico@azti.es bbeldarrain@azti.es	yes (Age coordinator) yes yes
UK-Cefas	Cefas Pakefield Road Lowestoft, Suffolk, NR33 0HT UK	Mark Etherton	mark.etherton@cefas.co.uk	yes
Portugal - IPMA	Instituto Português do Mar e da Atmosfera Departamento do Mar e Recursos Marinhos Divisão de Modelação e Recursos da Pesca Av. Brasília, 1449-006 LISBOA, PORTUGAL	Eduardo Soares	esoares@ipma.pt	yes
Italy-COISPA	COISPA Tecnologia e Ricerca Satzione Sperimentale per lo studio delle risorse del mare via dei Trulli 18/20 70126 Bari - Italy	Carbonara Pierluigi Casciaro Loredana Gaudio Palma	carbonara@coispa.it casciaro@coispa.it gaudio@coispa.it	yes (Age coordinator) yes yes
Italy-IAMC-CNR	Istituto per l'Ambiente Marino Costiero - IAMC (Institute for Coastal Marine Environment) Consiglio Nazionale delle Ricerche - CNR Via del Mare, n°3 91021 Torretta Granitola (Fz. Campobello di Mazara, Tp),Italy	Gualtiero Basilone Salvatore Gancitano Salvatore Mangano Maurizio Pulizzi	gualtiero.basilone@iamc.cnr.it salvatore.gancitano@cnr.it salvatore.mangano@iamc.cnr.it maurizio.pulizzi@iamc.cnr.it	no (Age coordinator) yes yes yes
Greece-Fri	ELGO-Fisheries Research Institute 640 07 Nea Peramos Kavala Greece	Argyris Sapounidis Dimitra Panora Christina Milani	asapoun@inale.gr dpanora@inale.gr chrismilani13@hotmail.com	No (Age coordinator) yes yes
France-IFREMER	IFREMER 150 quai Gambetta BP 699 62 321 Boulogne sur mer, France	Kélig Mahé Elise Bellamy Patrick Grellier	Kelig.Mahe@ifremer.fr Elise.Bellamy@ifremer.fr Patrick.Grellier@ifremer.fr	No (Age coordinator) yes yes
Slovenia-ZZRS	ZZRS Fisheries Research Institute of Slovenia Ljubljana, Slovenia	Tomaž Modic	Tomaz.Modic@zzrs.si	Yes

Table 2.3. The names of the exchange participants with reader's identification (ID), their associated institution/laboratory, country, level of experience of anchovy ageing, areas where they have experience, and assessment readers.

Reader	Name/ID	Institution	Country	Expertise level/Years		Area Expertise	Assessment reader
1	Andrés Uriarte/AU	AZTI	Spain	High	>20	VIII_Bay of Biscay	Yes
2	Iñaki Rico/IR	AZTI	Spain	High	>20	VIII_Bay of Biscay	Yes
3	Patrick Grellier/PG	IFREMER	France	High	>20	VIII_Bay of Biscay	Yes
4	Salvatore Gancitano/SG	IAMC-CNR	Italy	high	>20	GSA16_Strait of Sicily	No
5	Pedro Torres/PT	IEO	Spain	High	>10	GSA01_Alboran Sea & GSA06_Western Mediterranean	Yes
6	Clara Dueñas/CD	IEO	Spain	High	>5	VIII_Bay of Biscay & IXa North	Yes
7*	Charo Navarro/CN	IEO	Spain	High	>5	VIII_Bay of Biscay & IXa North	No
8	Jorge Tornero/JT	IEO	Spain	High	>5	IXa_Gulf of Cadiz	Yes
9	Pierluigi Carbonara/PC	COISPA	Italy	High	>5	GSA10_Southern Thyrrenian & GSA19_Western Ionian	Yes
10	Loredana Casciaro /LC	COISPA	Italy	medium	4	GSA10_Southern Thyrrenian & GSA19_Western Ionian	No
11	Ana Antolinez/AA	IEO	Spain	Low	1	VIII_Bay of Biscay & IXa North	No
12	Salvatore Mangano/SM	IAMC-CNR	Italy	Low	1	GSA16_Strait of Sicily	Yes
13	Maurizio Pulizzi/MP	IAMC-CNR	Italy	low	1	GSA16_Strait of Sicily	Yes
14	Christina Milani/CM	ELGO	Greece	low	1	GSA22_Aegean Sea	Yes
15	Elise Bellamy/EB	IFREMER	France	low	1	VIII_Bay of Biscay & GSA07_Gulf of Lion	Yes
16	Eduardo Soares/ES	IPMA	Portugal	Low	2	IXa_Portugal Coast	Yes
17	Dimitra Panora/DP	ELGO	Greece	low	1	GSA22_Aegean Sea	Yes
18	Tomaž Modic /TM	ZZRS	Slovenia	High	>5	Adriatic Sea	Yes
19	Palma Gaudio/PG	COISPA	Italy	low	1	GSA10_Southern Thyrrenian & GSA19_Western Ionian	No

* Finally she did not read the otoliths

Table 2.4. Sets of otoliths by stock/area and calibration exercise in WebGR.

				Nº images for Exchange by months				
				First half of the year		Second half of the year		
Stock	Institute providing data	Areas	Calibration Exercice (CE) in WebGR	Nº images	Months	Nº images	Months	Length range
English Channel	IFREMER	VIIed	ANE_VII	-	-	20	Sept-Oct	9.5-20 cm
Bay of Biscay	IFREMER/AZTI	VIIIa	ANE_VIII	10	March	22	Sept	13.5-17 cm
	AZTI	VIIIb		15	April	3	Sept	8-17 cm
	IEO-Santander	VIIIc		10	March-June	10	Aug-Nov	9.5-18 cm
Division IXa	IPMA	IXa CN	ANE_IXa	10	April-May	10	August-Sept	11-15.5 cm
	IEO-Cadiz	IXa South		36	March-June	36	July-Nov	7-16 cm
GSA01	IEO-Málaga	Northern Alboran Sea	ANE_GSA01	35	May	35	August	10.5-16 cm
GSA06	IEO-Málaga	Western Mediterranean (Northern of Spain)	ANE_GSA06	30	April-June	30	August	11-16.5 cm
GSA07	IFREMER	Gulf of Lion	ANE_GSA07	18	February	20	July	9-14.5 cm
GSA16	IAMC-CNR	Strait of Sicily	ANE_GSA16	32	April-May	34	Sept	8-17 cm
GSA10	COISPA	Southern Thyrrenian	ANE_GSA10	25	May	30	August-Sept	8-15 cm
GSA19	COISPA	Western Ionian	ANE_GSA19	25	April-May	30	August-Sept	8-14 cm
GSA22	ELGO	Aegean Sea	ANE_GSA22	36	June	34	September	8-13 cm
		Total Images		282		294		
				576				

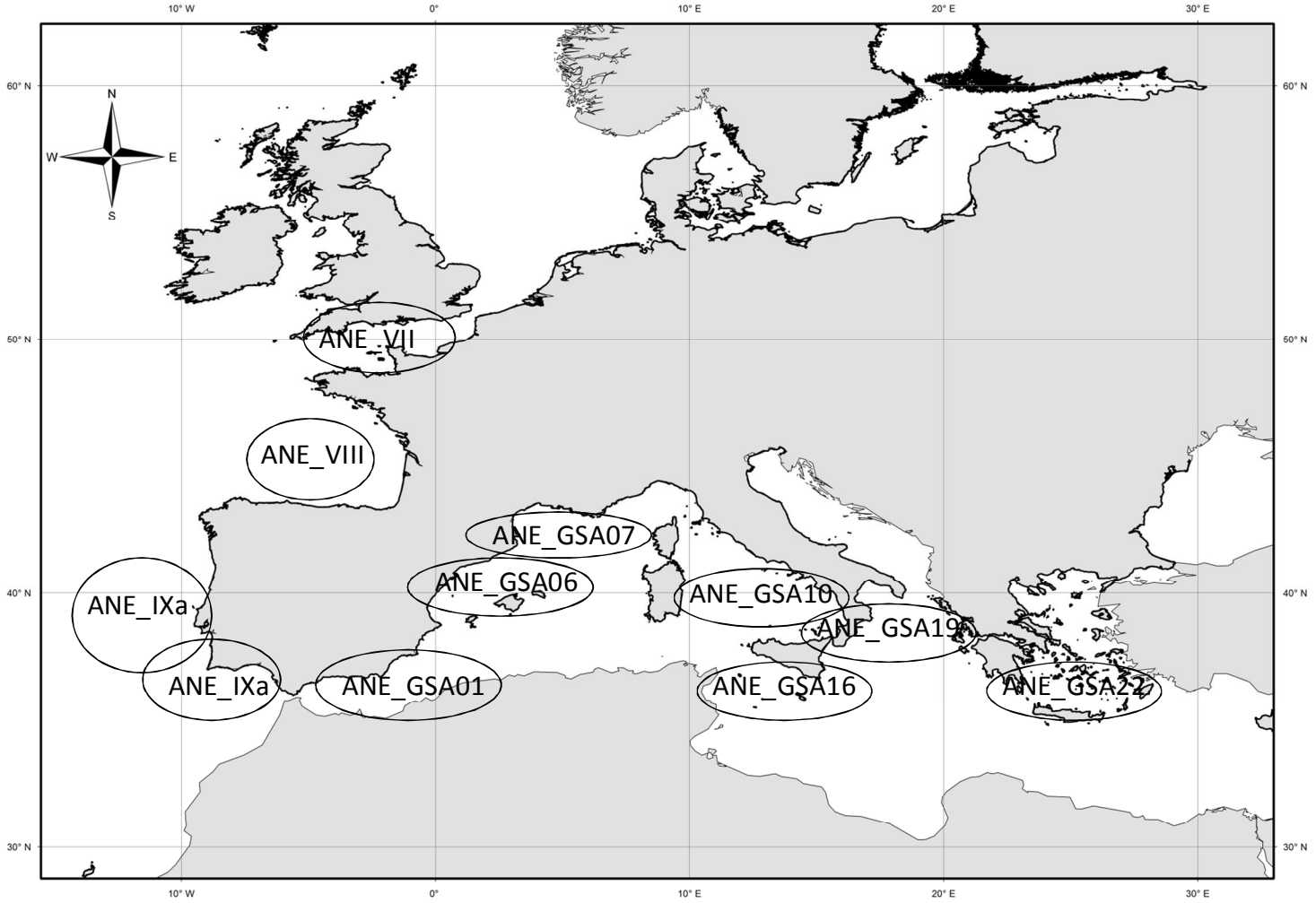

Figure 2.1. Collection areas of 2014 otolith exchange sample sets

3. RESULTS

3.1. ALL AREAS

Analyses were performed for the total areas and each area. For each area overall age reading were analyzed and three additional analyses were performed: Analysis only with the expert group, analysis referring to intermediate and training group and analysis only with area readers in those areas where there were more than one reader (Bay of Biscay, IXa area, Strait of Sicily, Southern Tyrrhenian, Western Ionian and Aegean Sea).

Overall age reading results for each are shown in Annex 1 to 10. From the total of 576 pictures of anchovy otoliths six readers analyzed all images; nine readers analyzed between 571 to 575 images, two readers analyzed 559 and 543 respectively, and one reader 505 images.

Overall agreement is 65.5% for all readers, 66.7 % for intermediate & training readers, and 71.8% for the expert group. The analysis including all age readers revealed an overall coefficient of variation (CV) of 58.2%. For all areas, the agreement with the modal age of all readers and for intermediate & training readers was low (between 59 and 74%) and CV was high (between 31 and 127%) (Table 3.1.1 and Figure 3.1.1). In the case of the expert group, also reveals agreements and CV highly variable, depending on the areas, showing the highest agreement in the area VII and VIII, with 80% agreement in both cases, and high variation of CV (73% and 22% respectively). In general, the results of the expert group improved compared to those of intermediate & training group in all areas, except in some areas of the Mediterranean (i.e. Western Mediterranean, Southern Tyrrhenian and Ionian Sea). The results of the area readers group are much better (higher % agreement and lower CV) than the other groups of readers (including expert group), except for the area IXa (quite similar with respect expert group). Analysis only done with the area readers group shows a higher overall agreement and low CV for Bay of Biscay readers and Aegean readers (91% & 97% of agreement; CV of 11.4% & 6.7%, respectively). In general for all areas, the relative bias indicate overall high bias. (Table 3.1.1 and Figure 3.1.1).

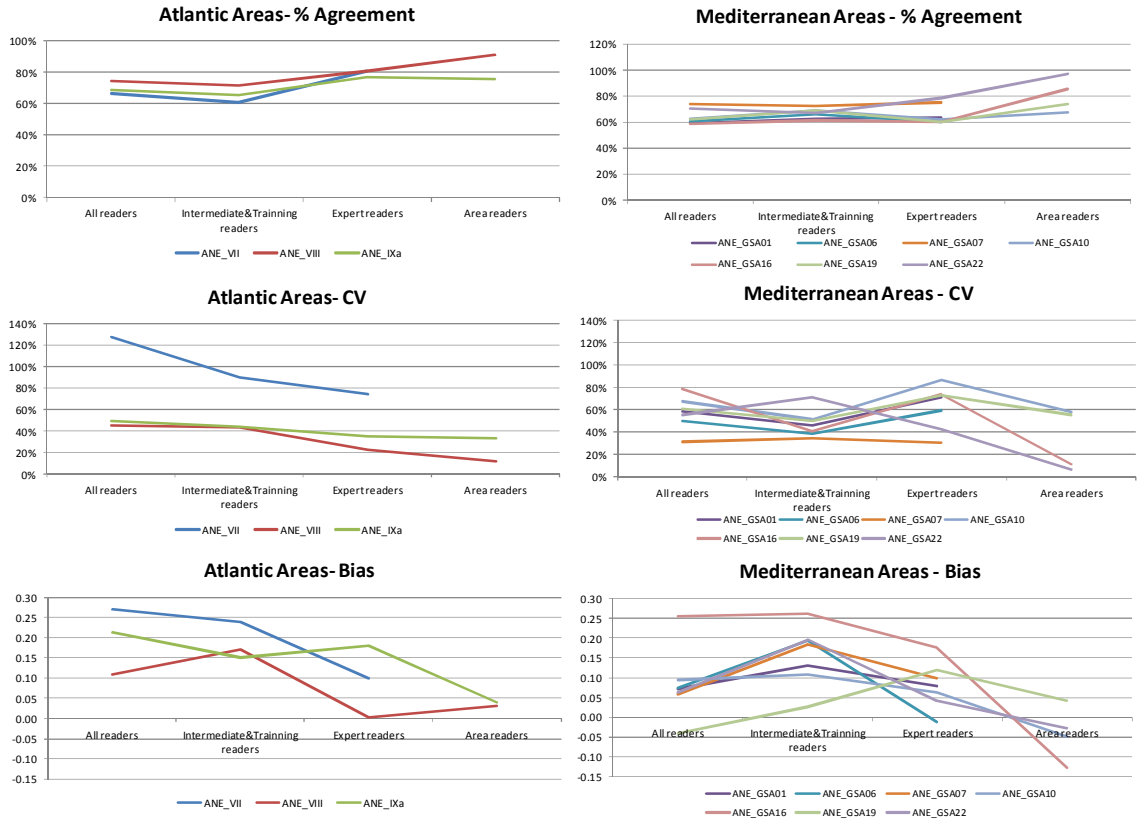

Figure 3.1.1 Summary of the average percentage of agreement, CV and relative bias by area.

Table 3.1.1 Summary of the average percentage of agreement, CV and relative bias by area y total.

% Agreement

Set	All readers	Intermediate&Trainning readers	Expert readers	Area readers
Total	65.5%	66.7%	71.8%	
ANE_VII	66.7%	60.9%	80.4%	
ANE_VIII	74.3%	71.3%	80.8%	90.9%
ANE_IXa	68.5%	65.4%	76.4%	75.7%
ANE_GSA01	58.9%	62.5%	63.5%	
ANE_GSA06	60.9%	66.2%	59.6%	
ANE_GSA07	73.4%	72.6%	75.1%	
ANE_GSA10	62.9%	68.9%	62.0%	67.3%
ANE_GSA16	58.5%	61.0%	59.9%	85.6%
ANE_GSA19	61.9%	68.9%	60.2%	73.5%
ANE_GSA22	70.0%	67.1%	78.3%	97.1%

CV

Areas	All readers	Intermediate&Trainning readers	Expert readers	Area readers
Total	58.2%	48.6%	51.8%	
ANE_VII	127.6%	90.0%	73.9%	
ANE_VIII	45.1%	44%	22.4%	11.4%
ANE_IXa	49.1%	43.9%	34.7%	33.0%
ANE_GSA01	58.7%	45.6%	71.1%	
ANE_GSA06	49.9%	38.5%	59.2%	
ANE_GSA07	31.3%	34.1%	30.3%	
ANE_GSA10	67.2%	51.2%	86.7%	58.1%
ANE_GSA16	78.7%	40.7%	73.8%	11.2%
ANE_GSA19	60.9%	50.1%	73.3%	55.3%
ANE_GSA22	55.7%	71.6%	42.8%	6.7%

Bias

Areas	All readers	Intermediate&Trainning readers	Expert readers	Area readers
Total	0.11	0.16	0.08	
ANE_VII	0.27	0.24	0.10	
ANE_VIII	0.11	0.17	0.00	0.03
ANE_IXa	0.21	0.15	0.18	0.04
ANE_GSA01	0.07	0.13	0.08	
ANE_GSA06	0.07	0.19	-0.01	
ANE_GSA07	0.06	0.19	0.10	
ANE_GSA10	0.10	0.11	0.06	-0.05
ANE_GSA16	0.26	0.26	0.18	-0.13
ANE_GSA19	-0.04	0.03	0.12	0.04
ANE_GSA22	0.06	0.20	0.04	-0.03

3. 2 ENGLISH CHANNEL (ANE_VII)

Overall age reading results are shown Annex 1. From the total of 20 pictures of anchovy otoliths 16 readers analyzed all images and two readers 19 images.

Table 3.2.1 and Figure 3.2.1 shows the % agreement and CV by readers group. Overall agreement is 66.7%. The best agreements are reached for age 0 (76%), for age 1 and 2 agreements are between 57 and 59%, and very low agreement for age 3 (44%).

Analysis only done with the expert group shows a higher overall agreement of 80% (Table 3.2.1), analysis referring to experts and intermediate (9 readers) shows an overall agreement of 60.9%, lower than the agreement between all readers.

The analysis including all age readers revealed a very high overall coefficient of variation (CV) of 127.6%. CV peaked at 214.8% for modal age 0 which was due mostly to two readers who interpreted a number of otoliths as age 1 & 2 in opposite to the other readers. Lowest CVs were revealed for modal age group 2. Overall CV for the expert group was 74% and for the group of intermediate % training reader 90%.

Figure 3.2.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Greatest deviations from the modal age (solid line) can be seen for the all ages. As the overall agreement between readers is less with older ages, the standard deviations are also mostly higher for the older ages for all readers combined (Figure 3.2.3) but also looking at the individual readers (Figures 3.2.2). In general, all readers showed a trend to overestimate the younger fish and underestimate the older ages (age 3).

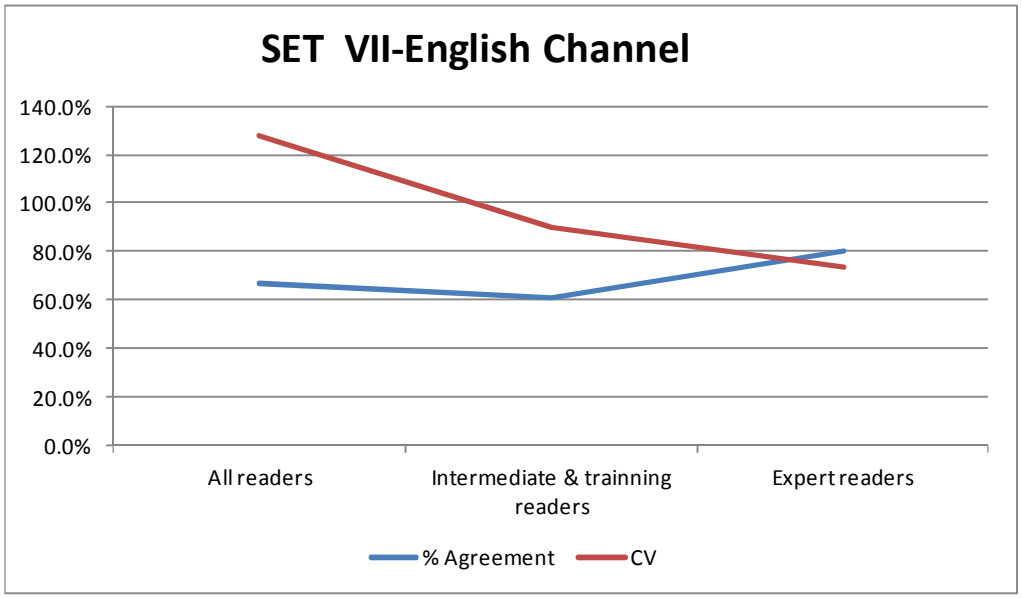

Figure 3.2.1. ANE_VII: % agreement and CV by readers group.

Table 3.2.1. ANE_VII: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	10	76.1%	214.8%	0.29
1	3	57.4%	49.0%	0.56
2	6	59.4%	36.8%	0.25
3	1	44.4%	-	-0.61
4	-	-	-	-
5	-	-	-	-
Total	**20**	**66.7%**	**127.6%**	**0.27**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	8	65.3%	158.3%	0.42
1	2	55.6%	96.3%	-0.17
2	8	60.6%	35.7%	0.23
3	2	50.0%	27.3%	0.00
4	-	-	-	-
5	-	-	-	-
Total	**20**	**60.9%**	**90.0%**	**0.24**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	10	93.3%	106.3%	0.08
1	4	75.0%	49.8%	0.36
2	6	62.3%	36.0%	-0.04
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**20**	**80.4%**	**73.9%**	**0.10**

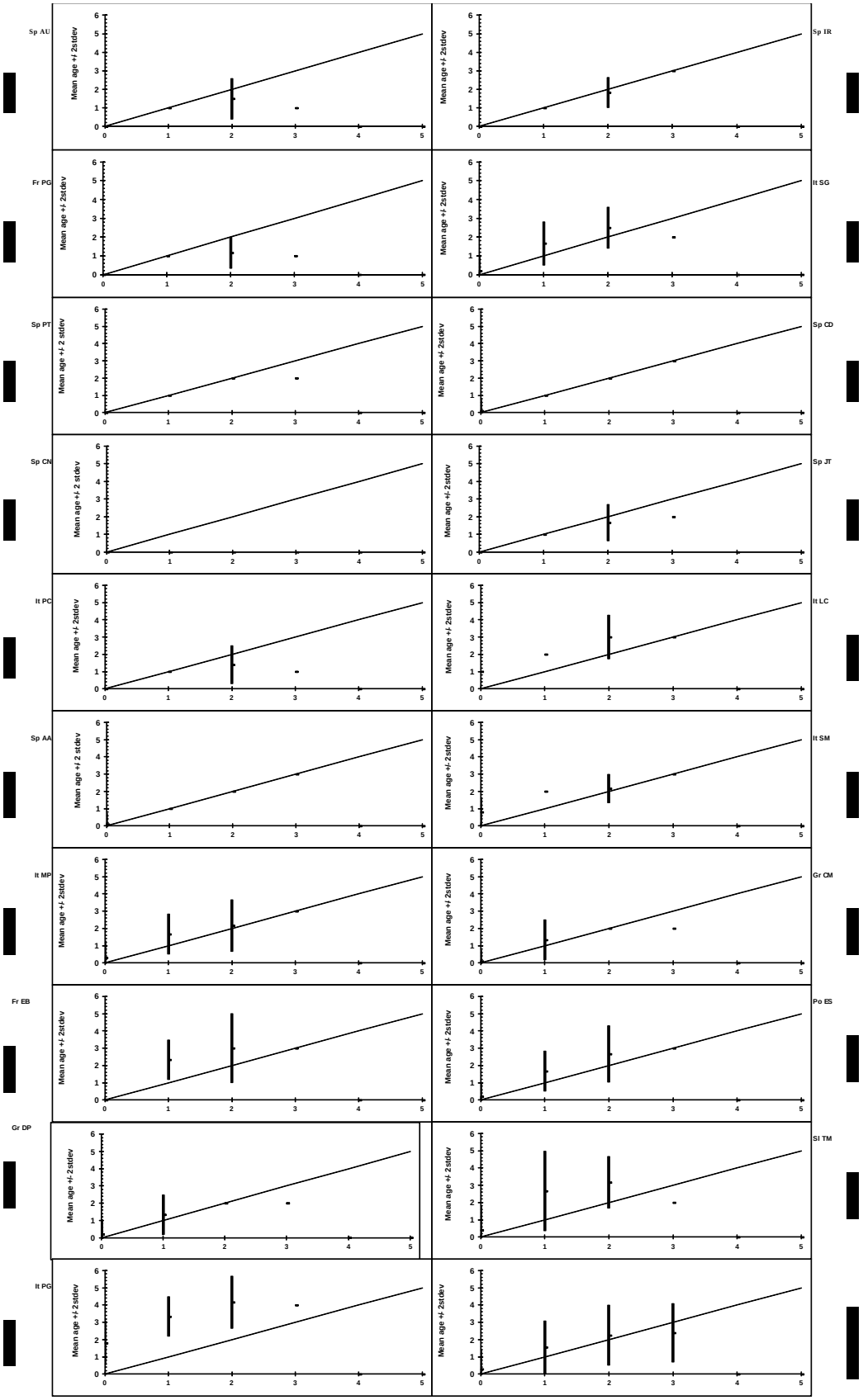

Figure 3.2.2. ANE_VII: Age bias plots with the mean age recorded +/- 2stdev of each age reader 1 to 10 plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL

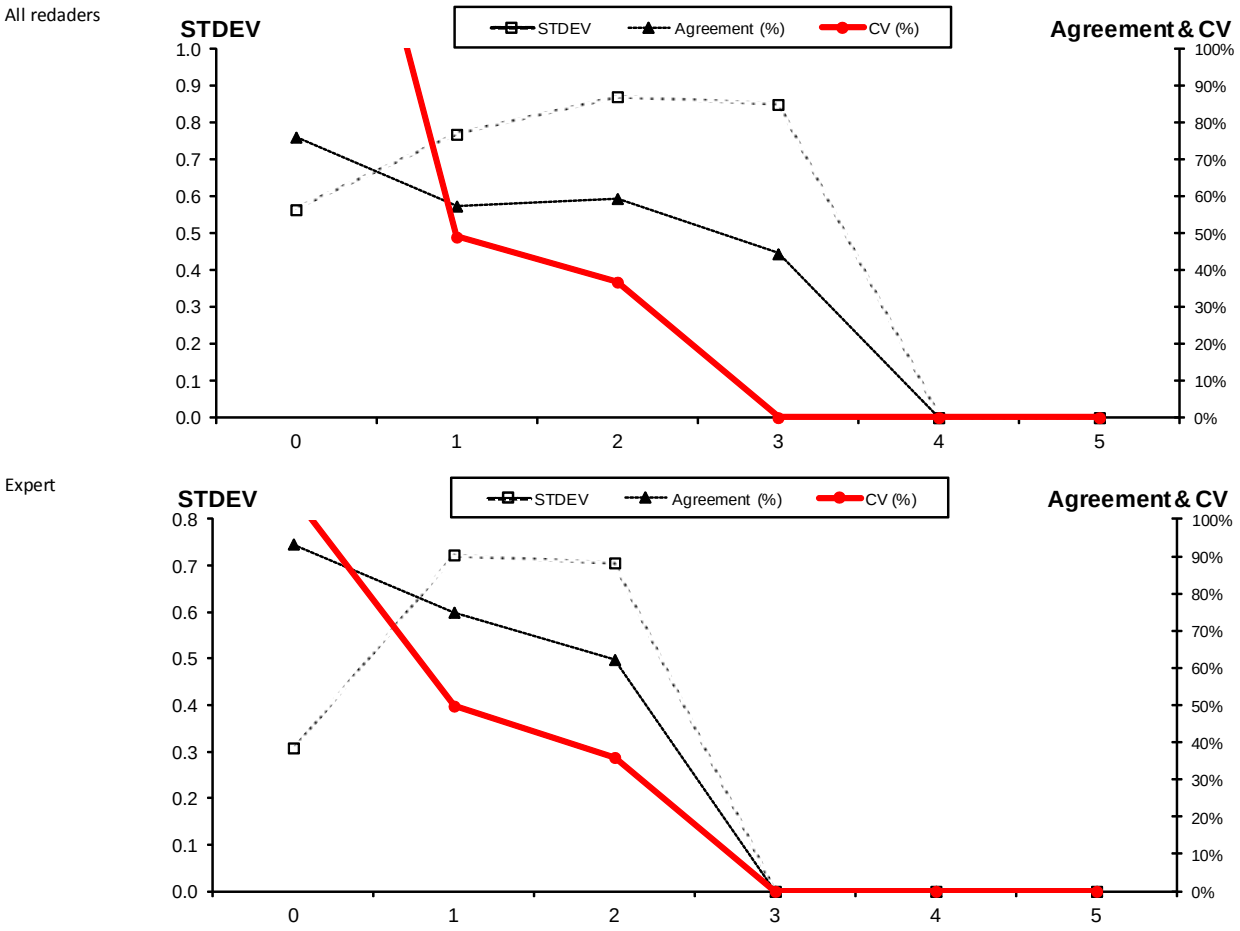

Figure 3.2.3. ANE_VII: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 3 BAY OF BISCAY (ANE_VIII)

Overall age reading results are shown Annex 1. From the total of 70 pictures of anchovy otoliths 14 readers analyzed all images, three readers between 68 and 69 image and one reader 58 images.

Table 3.3.1 and Figure 3.3.1 shows the % agreement and CV by readers group Overall agreement is 74.3 % (Table 3.3.1). The best agreements are reached for age 0 (88.5 %), for age 1 and 2 agreements are 71.3 and 78.5% respectively, and the lowest agreement for age 3 (65.2%).

Analysis only done with the Bay of Biscay group (6 readers) shows a higher overall agreement of 90.9% (Table 3.3.1), analysis referring to experts group shows an overall agreement of 80.8%, and analysis of intermediate & training reading group shows an overall agreement of 71.3%, lower than the agreement between all readers.

The analysis including all age readers revealed a very high overall coefficient of variation (CV) of 45.1% (Table 3.2.1 and Figure 3.3.1). CV peaked at 186.8% for modal age 0 which was due mostly to two readers who interpreted a number of otoliths as age 1 in opposite to the other readers. Lowest CVs were revealed for modal age group 3. Overall CV for the Bay of Biscay readers group was 11.4%, for the expert group was 22.4%, and for the intermediate & training group 44%. For expert group and Bay of Biscay reader group reach a 0% CV at age 0, with the largest CV at age 1 in both cases (32.5 and 17.5% respectively). Bay of Biscay readers shows lower CV at ages 2 and 3 (7.9 and 6.8% respectively).

Figures 3.3.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for the all ages in some readers. As the overall agreement between reader is less with older ages, the standard deviations are also mostly higher for the older ages for all readers combined (Figure 3.3.3) but also looking at the individual readers (Figures 3.3.2). In general, most readers showed a trend to underestimate the older ages (age 3). In the case of the expert group and the group of Bay of Biscay readers, the largest deviations are in the 1 year old (Figure 3.3.3).

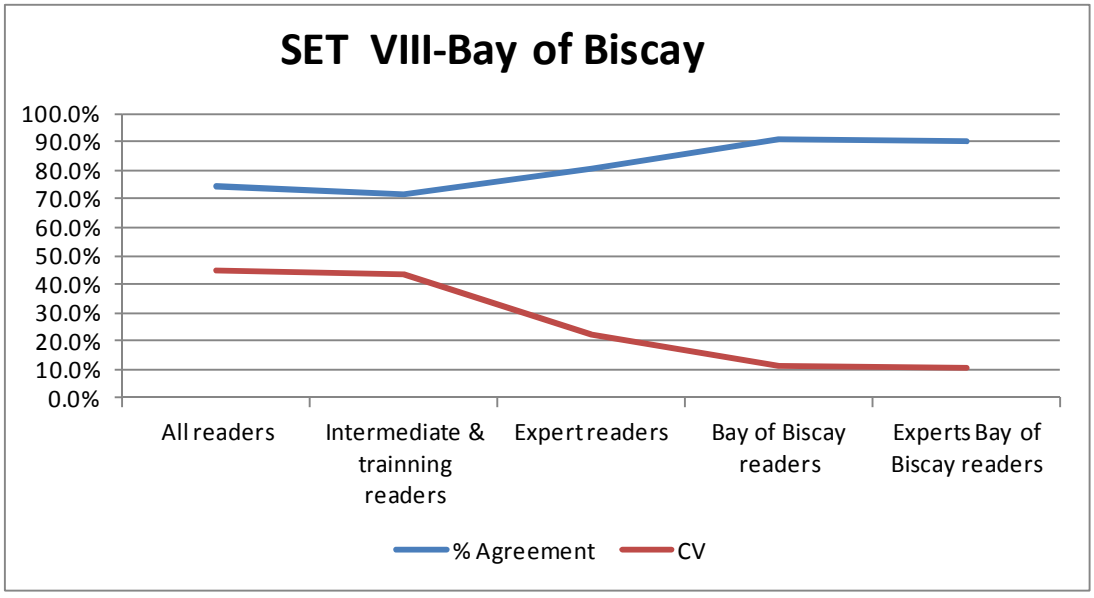

Figure 3.3.1. ANE_VIII: % agreement and CV by readers group.

Table 3.3.1. ANE_VIII: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	88.5%	186.8%	0.12
1	28	71.3%	44.3%	0.33
2	25	78.5%	23.1%	0.05
3	11	65.2%	19.9%	-0.33
4	-	-	-	-
5	-	-	-	-
Total	**70**	**74.3%**	**45.1%**	**0.11**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	86.3%	145%	0.14
1	24	70.3%	49%	0.36
2	34	71.6%	26%	0.15
3	6	59.3%	24%	-0.37
4	-	-	-	-
5	-	-	-	-
Total	**70**	**71.3%**	**44%**	**0.17**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	5	100.0%	0.0%	0.00
1	27	80.8%	32.8%	0.18
2	26	79.1%	19.2%	-0.06
3	12	76.9%	15.2%	-0.24
4	-	-	-	-
5	-	-	-	-
Total	**70**	**80.8%**	**22.4%**	**0.00**

Bay of Biscay readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	5	100.0%	0.0%	0.00
1	31	89.2%	17.5%	0.11
2	22	91.6%	7.9%	0.01
3	12	90.3%	6.8%	-0.10
4	-	-	-	-
5	-	-	-	-
Total	**70**	**90.9%**	**11.4%**	**0.03**

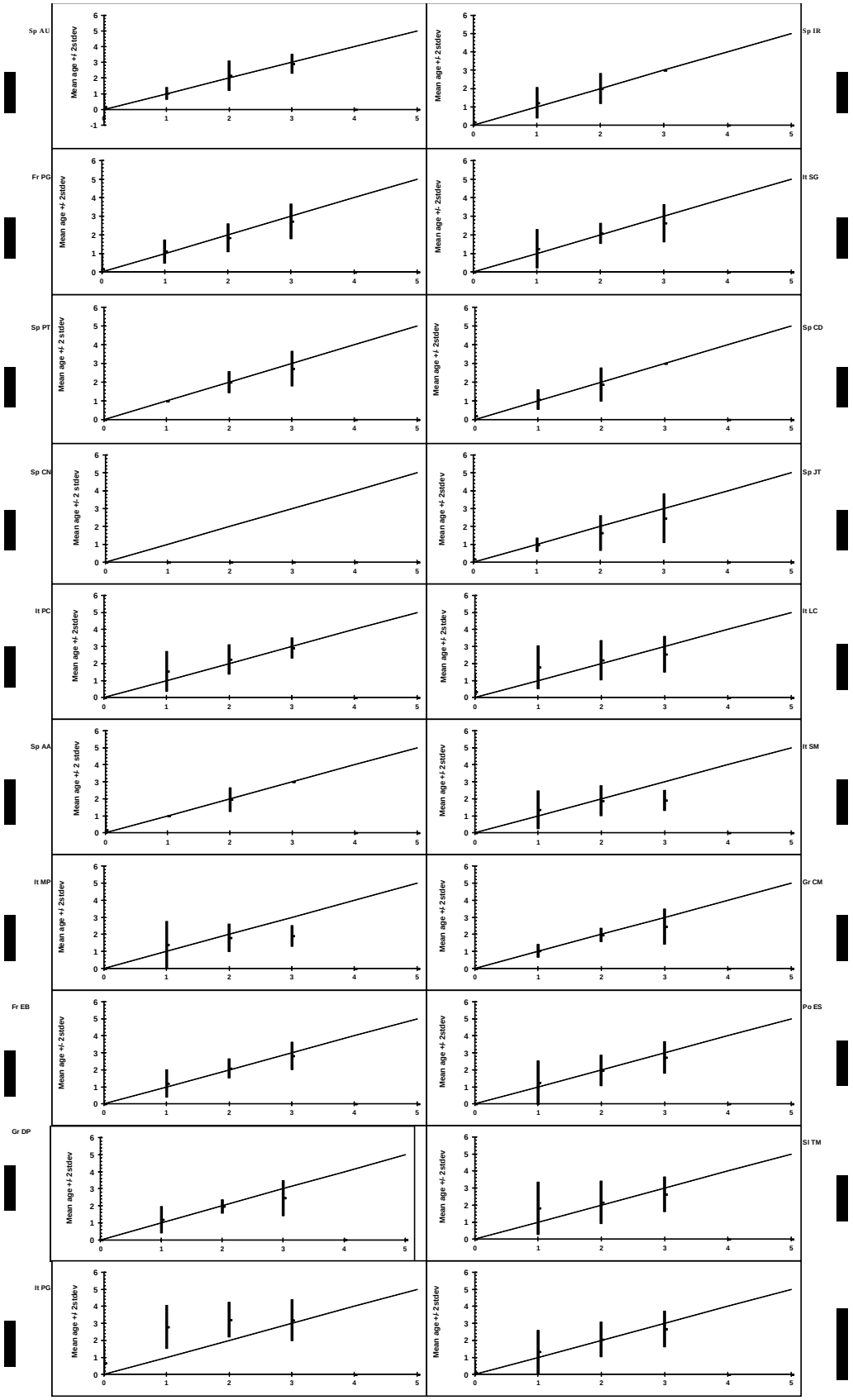

Figure 3.3.2. ANE_VIII: Age bias plots with the mean age recorded +/- 2stdev of each age reader 1 to 10 plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

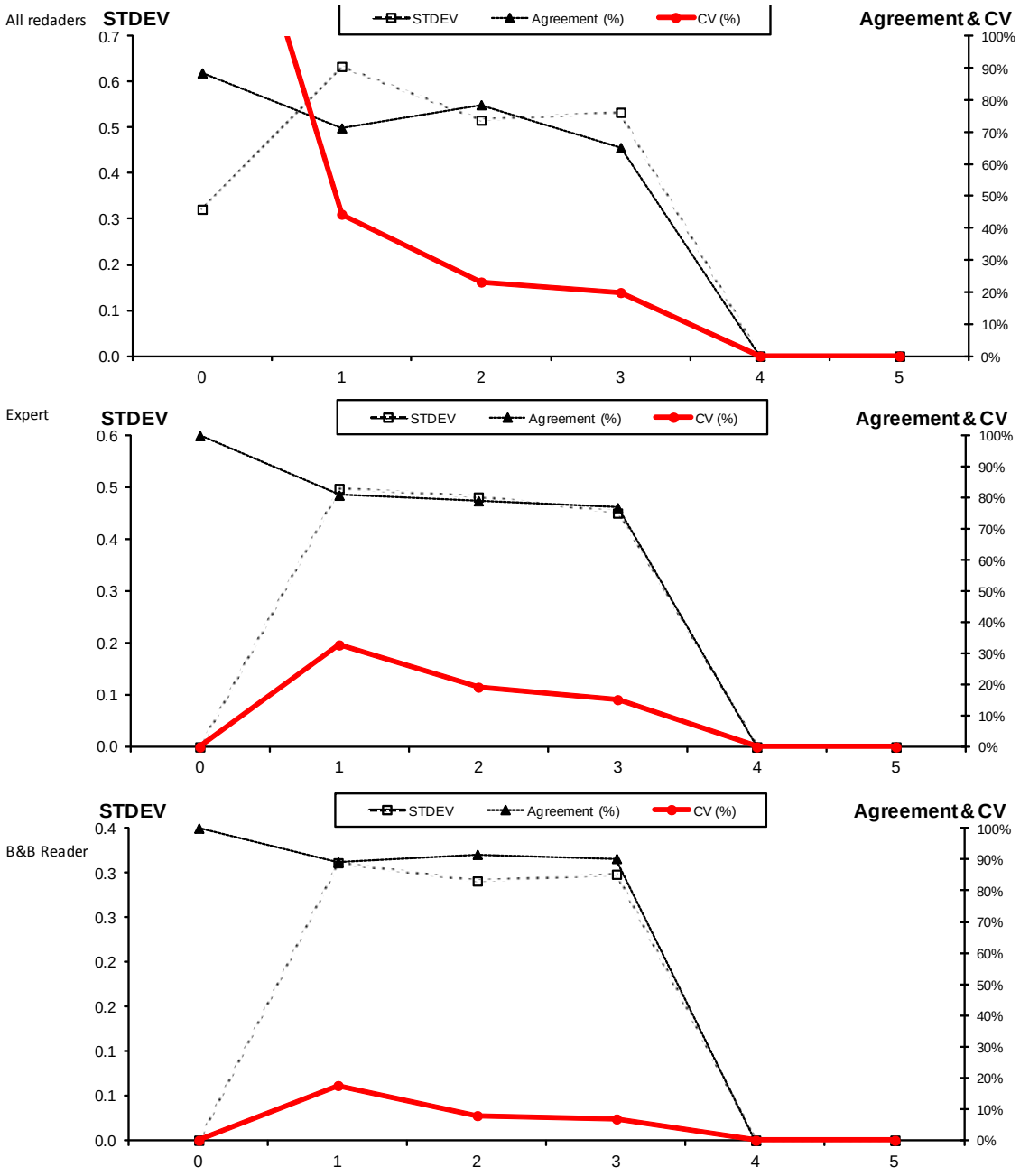

Figure 3.3.3. ANE_VIII: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 4 GULF OF CADIZ AND PORTUGAL COAST (ANE_IXA)

Overall age reading results are shown Annex 1. From the total of 92 pictures of anchovy otoliths 15 readers analyzed all images, two readers 91 images and one reader 81 images.

Table 3.4.1 and Figure 3.4.1 shows the % agreement and CV by readers group. Overall agreement is 68.5 % (Table 3.4.1). The best agreements are reached for age 0 (87.8 %), for age 1 and 2 agreements are 68.6 and 64.1% respectively. Not age 3 were read in this area.

Analysis done with the Expert group and IXa reader group (3 readers) show a similar agreement (76.4% and 75.4% respectively) and slightly higher than considering all readers (Table 3.4.1), analysis referring intermediate & training reading group shows an overall agreement of 65.4%, lower than the agreement between all readers. For expert group and IXa readers group reach up to 90 and 94% agreement for age 0.

The analysis including all age readers revealed a high overall coefficient of variation (CV) of 49.1% (Table 3.4.1 and Figure 3.4.1). CV peaked at 203.8% for modal age 0 which was due mostly to two readers who interpreted a number of otoliths as age 1 in opposite to the other readers. Overall CV for the IXa readers group was 33%, for the expert group was 34.7%, and for the intermediate & training group 43.9%. For expert group and IXa reader group show similar high CV in the three age groups (0-2 years old) between 19-38%.

Figure 3.4.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen mainly for ages 1 & 2 in most readers, some readers overestimating and other readers underestimating these ages. As the overall agreement between readers is less with older ages, the standard deviations are also mostly higher for the older ages for all readers combined (Figure 3.4.3) but also looking at the individual readers (Figures 3.4.2). In the case of the expert group and the group of IXa readers, the largest deviations are in the 1 and 2 year old (Figure 3.4.3).

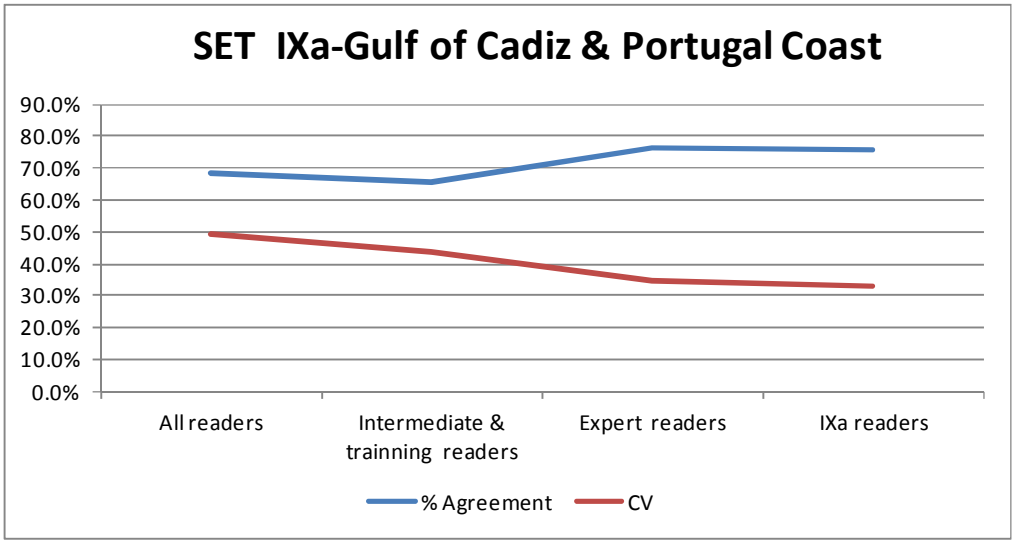

Figure 3.4.1. ANE_IXa: % agreement and CV by readers group.

Table 3.4.1. ANE_IXa: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	5	87.8%	203.8%	0.13
1	64	68.6%	43.3%	0.30
2	23	64.1%	31.8%	-0.01
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**92**	**68.5%**	**49.1%**	**0.21**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	5	75.6%	135.5%	0.27
1	47	68.0%	44.0%	0.30
2	39	61.4%	32.7%	-0.03
3	1	55.6%	-	-0.22
4	-	-	-	-
5	-	-	-	-
Total	**92**	**65.4%**	**43.9%**	**0.15**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	90.7%	19.8%	0.15
1	71	75.5%	37.9%	0.23
2	15	74.8%	25.5%	-0.07
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**92**	**76.4%**	**34.7%**	**0.18**

IXa readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	94.4%	28.9%	0.06
1	51	79.7%	32.9%	0.22
2	35	66.7%	33.8%	-0.22
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**92**	**75.7%**	**33.0%**	**0.04**

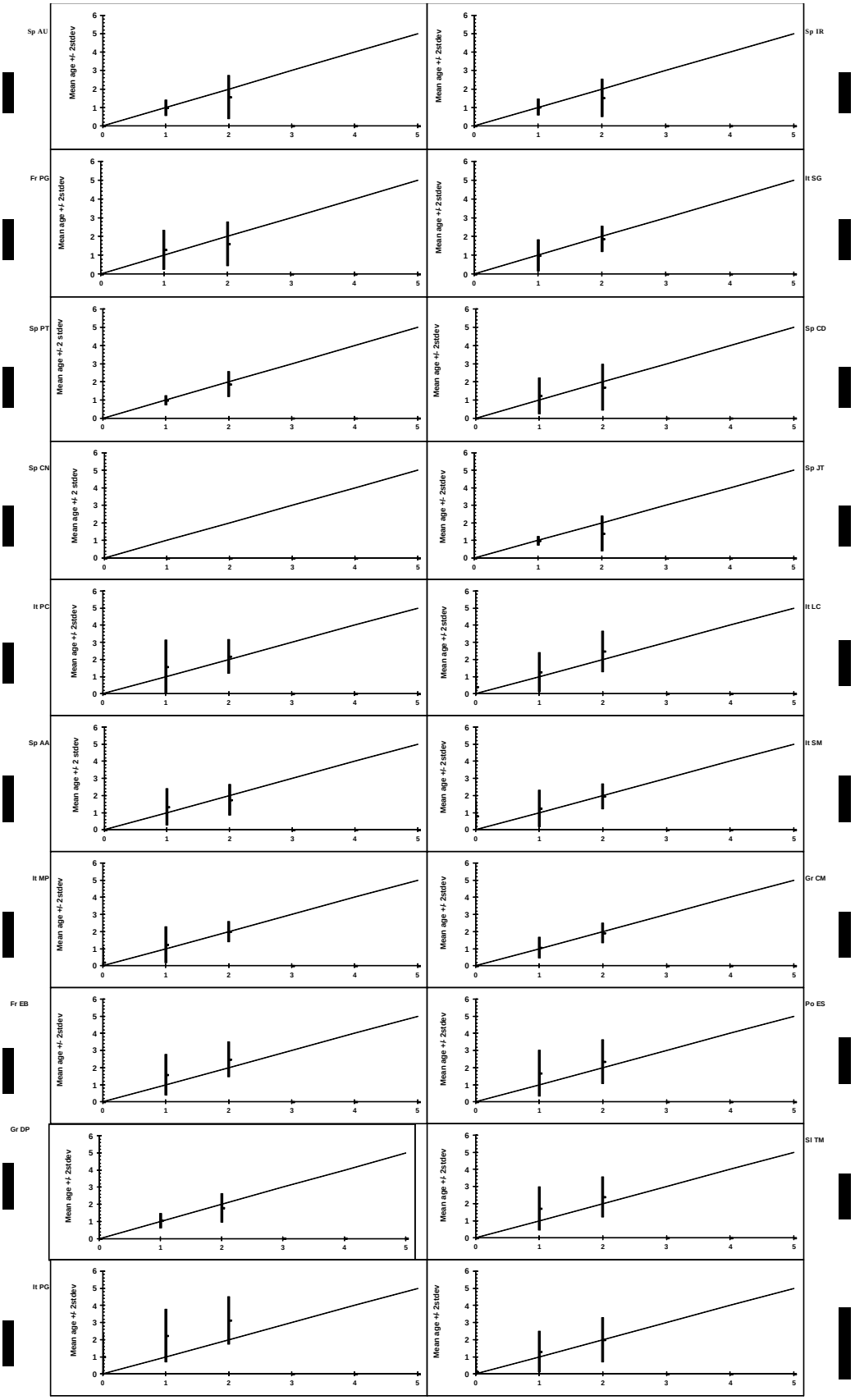

Figure 3.4.2. ANE_IXa: Age bias plots with the mean age recorded +/- 2stdev of each age reader 1 to 10 plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

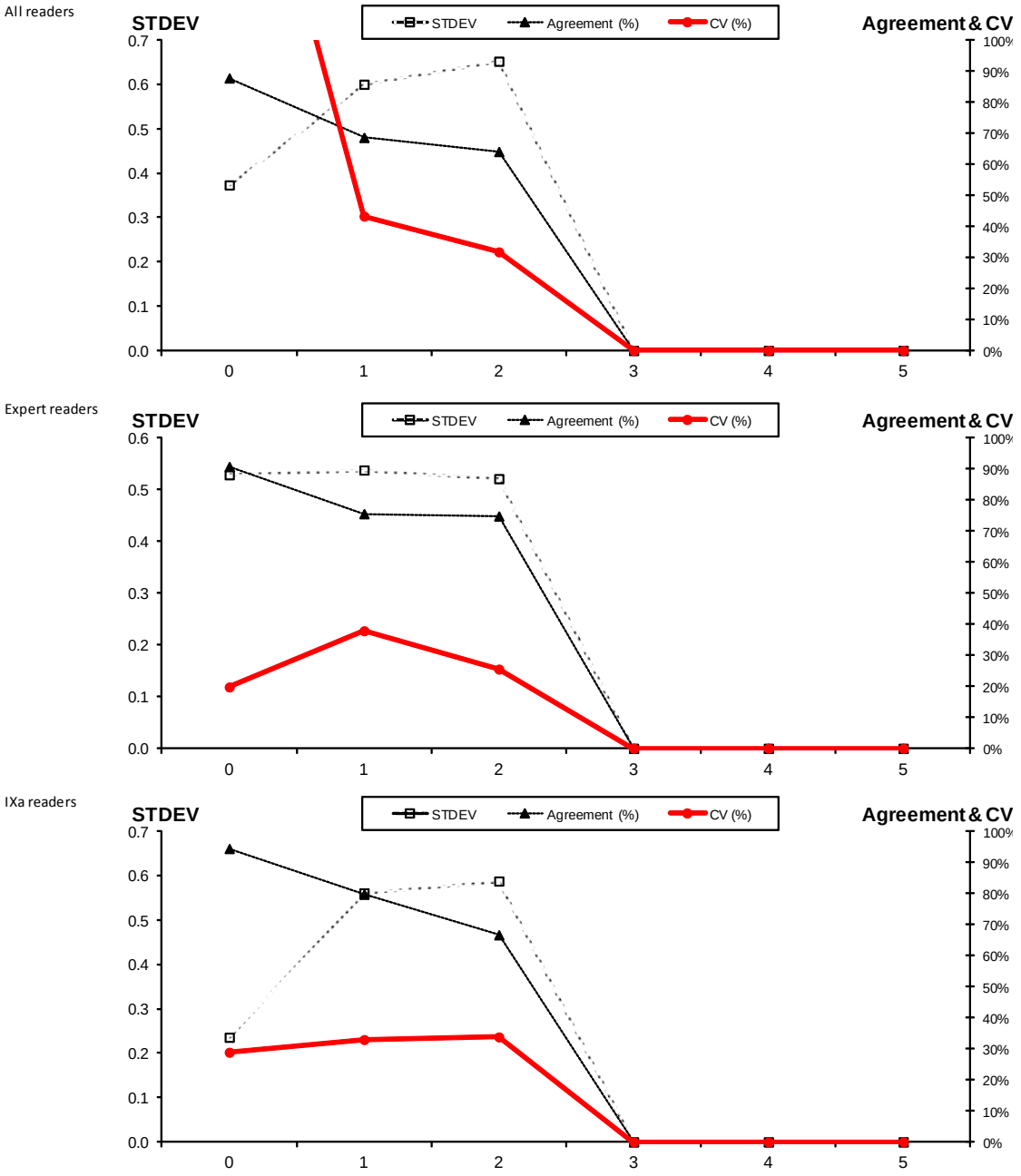

Figure 3.4.3. ANE_IXa: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 5 ALBORAN SEA (ANE_GSA01)

Overall age reading results are shown Annex 4. From the total of 70 pictures of anchovy otoliths 11 readers analyzed all images, five readers between 68 and 69 images and two reader only 48 and 28 images respectively.

Table 3.5.1 and Figure 3.5.1 shows the % agreement and CV by readers group. Overall agreement is 58.9 % (Table 3.5.1). The best agreements are reached for age 1 (65.5 %), for age 0 and 2 the agreements are 52.4 and 50.5% respectively and the lowest agreement for age 3 (38.9%).

Analysis done with the Expert group and Intermediate & training group show a similar agreement (63.5% and 62.5% respectively) and slightly higher than considering all readers (Table 3.5.1). No age 0 is read by the Intermediate & Trainning group and no age 3 is read by the expert group. Since there is only one reader who usually reads anchovy otoliths in this area, it has not been possible to create the group of GSA01 reader.

The analysis including all age readers revealed a high overall coefficient of variation (CV) of 58.9% (Table 3.5.1 and Figure 3.5.1). CV peaked at 117.6% for modal age 0 which was due mostly to four readers who interpreted a number of otoliths as age 1 in opposite to the other readers. Overall CV for the expert readers group was 71.1%, and for the intermediate & training group was 45.6%. For expert group, CV peaked at 149.6% for modal age 0 which was due mostly to four readers who interpreted a number of otoliths as age 1 and even two of them as age 2 and 3 in opposite to the other readers. For all groups show similar high CV in the age 1 and 2 years old between 34-58%.

Figures 3.5.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. As the overall agreement between readers is less with age 0 and older ages (2 and 3 years), the standard deviations are also mostly higher for the these ages for all readers combined (Figure 3.5.3) but also looking at the individual readers (Figures 3.5.2).

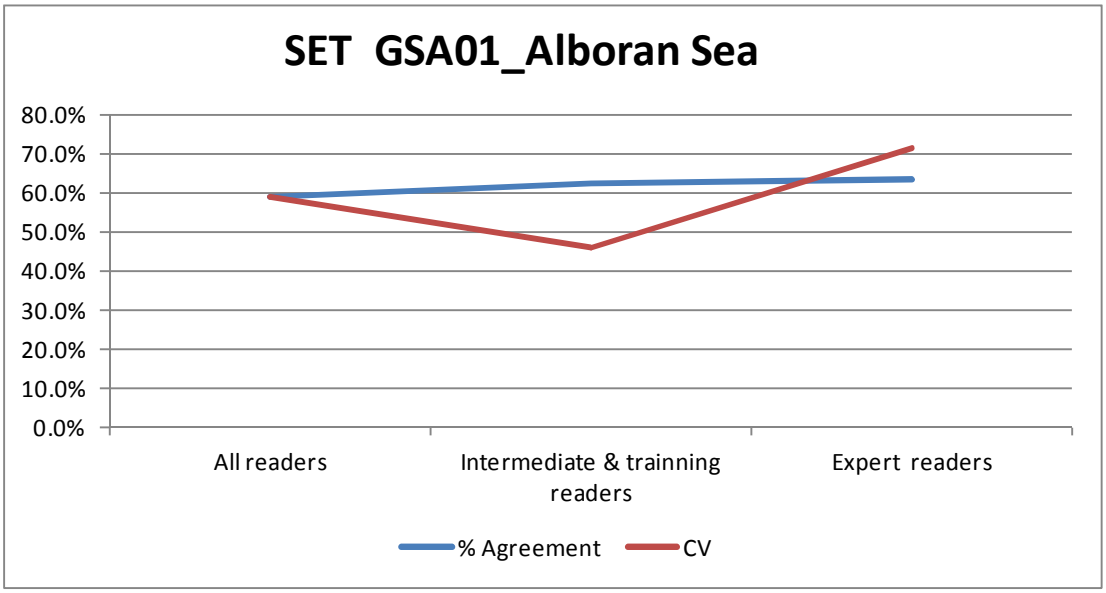

Figure 3.5.1. ANE_GSA01: % agreement and CV by readers group.

Table 3.5.1. ANE_GSA01: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	52.4%	117.6%	0.60
1	40	65.5%	58.0%	0.12
2	23	50.5%	45.5%	-0.11
3	1	38.9%	-	-0.72
4	-	-	-	-
5	-	-	-	-
Total	**70**	**58.9%**	**58.7%**	**0.07**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	20	68.1%	53.6%	0.19
2	25	57.6%	36.5%	0.11
3	3	46.9%	34.2%	-0.28
4	-	-	-	-
5	-	-	-	-
Total	**48**	**62.5%**	**45.6%**	**0.13**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	14	58.1%	149.1%	0.51
1	43	68.2%	54.8%	0.02
2	13	53.8%	40.9%	-0.18
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**70**	**63.5%**	**71.1%**	**0.08**

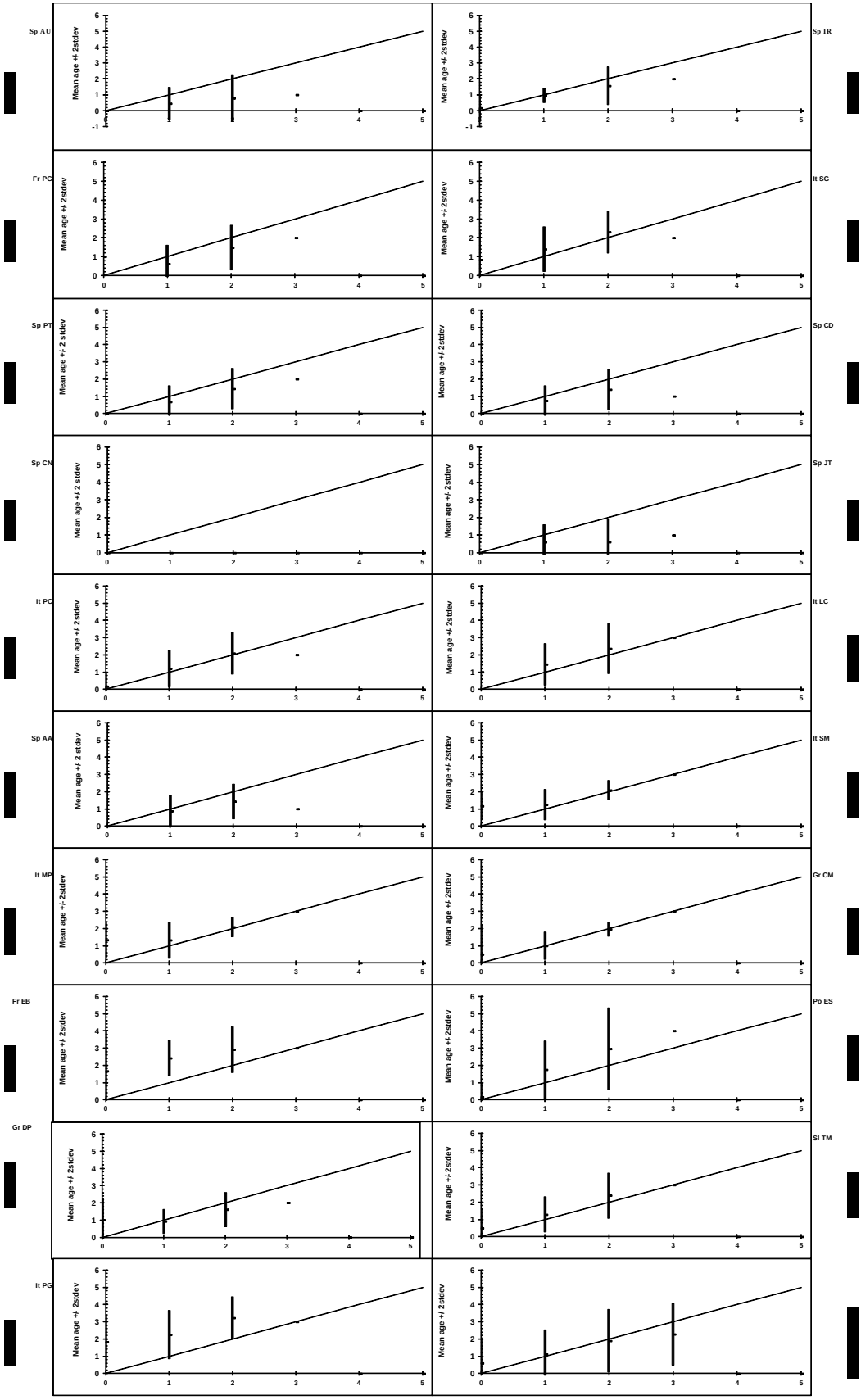

Figure 3.5.2. ANE_GSA01: Age bias plots with the mean age recorded +/- 2stdev of each age reader 1 to 10 plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

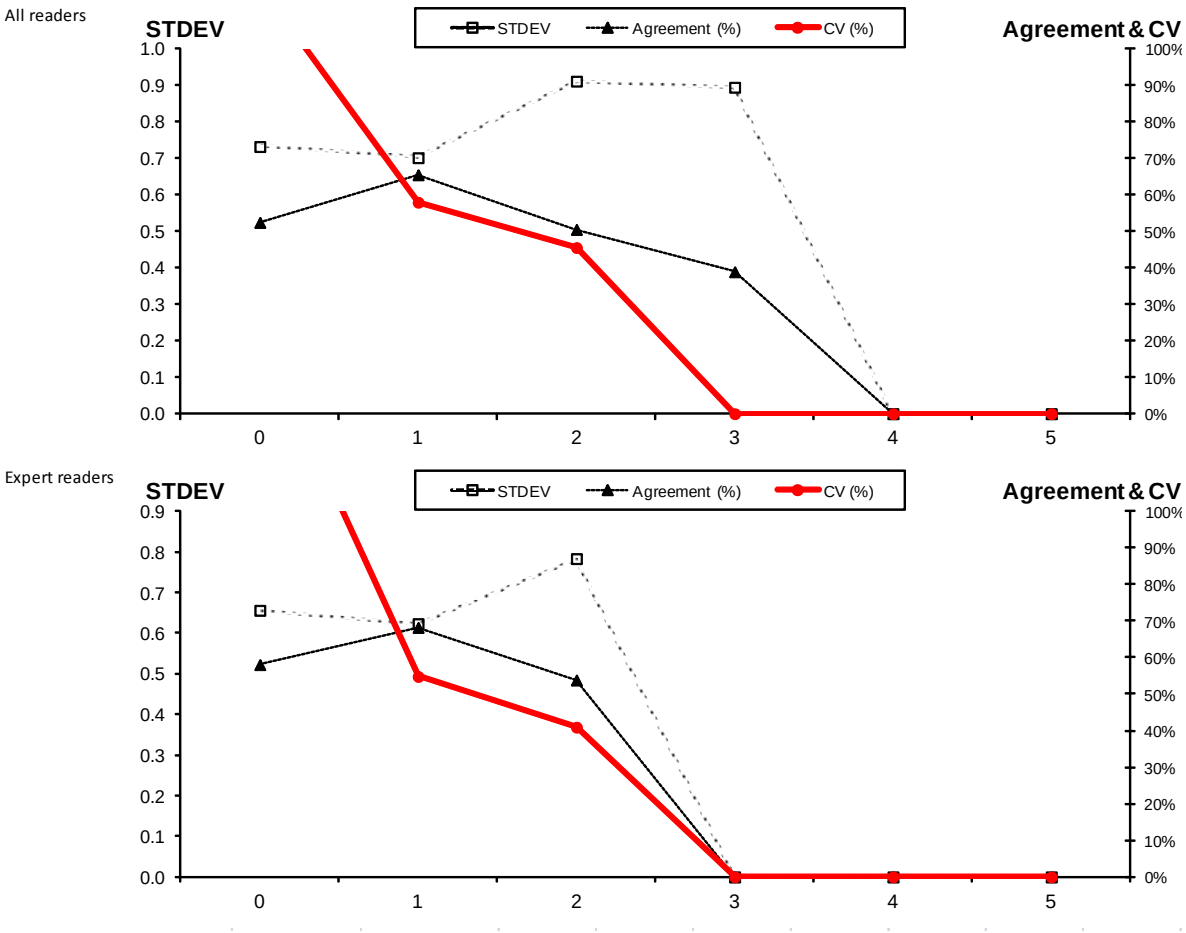

Figure 3.5.3. ANE_GSA01:The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 6 WESTERN MEDITERRANEAN (ANE_GSA06)

Overall age reading results are shown Annex 1. From the total of 60 pictures of anchovy otoliths 15 readers analyzed all images, two readers 57 and 58 images and one reader only 49 images.

Table 3.6.1 and Figure 3.6.1 shows the % agreement and CV by readers group. Overall agreement is 60.9 % (Table 3.6.1). Only modal ages 1 and 2 have been shwon, reaching a similar agreement in the two ages (62.7% and 57.4% respectively).

The intermediate & training group reached more readers agreement that the expert group. No modal age 0 is shown by the Intermediate & Training group. Since there is only one reader who usually reads anchovy otoliths in this area, it has not been possible to create the group of GSA06 readers.

The analysis including all age readers revealed a high overall coefficient of variation (CV) of 49.9% (Table 3.6.1 and Figure 3.6.1). Overall CV for the expert readers group was 59.2%, and for the intermediate & training group was 38.5%. For expert group, CV peaked at 110.7% for modal age 0 which was due mostly to four readers who interpreted a number of otoliths as age 1 and even two of them as age 2 and 3 in opposite to the other readers. For all groups show similar high CV in the age 1 and 2 years old between 32-65%.

Figures 3.6.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. As the overall agreement between reader is less with age 2, the standard deviations are also mostly higher for this age for all readers combined (Figure 3.6.3) but also looking at the individual readers (Figures 3.6.2).

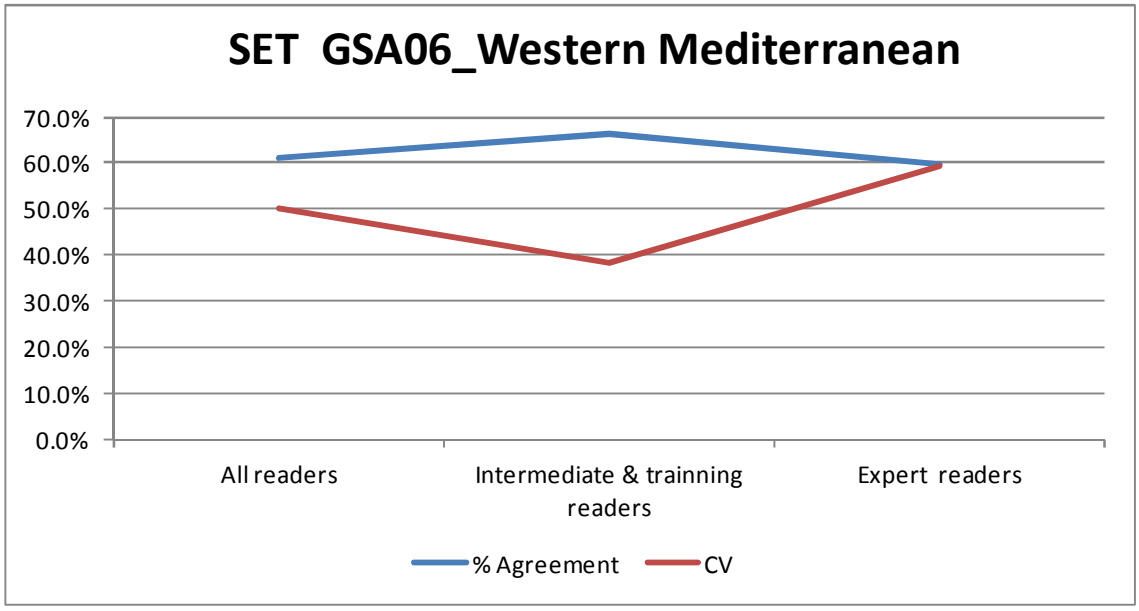

Figure 3.6.1. ANE_GSA06: % agreement and CV by readers group.

Table 3.6.1. ANE_GSA06: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	40	62.7%	55.9%	0.17
2	20	57.4%	38.1%	-0.12
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**60**	**60.9%**	**49.9%**	**0.07**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	34	70.6%	43.8%	0.31
2	26	60.7%	31.7%	0.05
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**60**	**66.2%**	**38.5%**	**0.19**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	3	46.2%	110.7%	0.69
1	42	60.5%	64.6%	0.02
2	15	59.7%	34.0%	-0.23
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**60**	**59.6%**	**59.2%**	**-0.01**

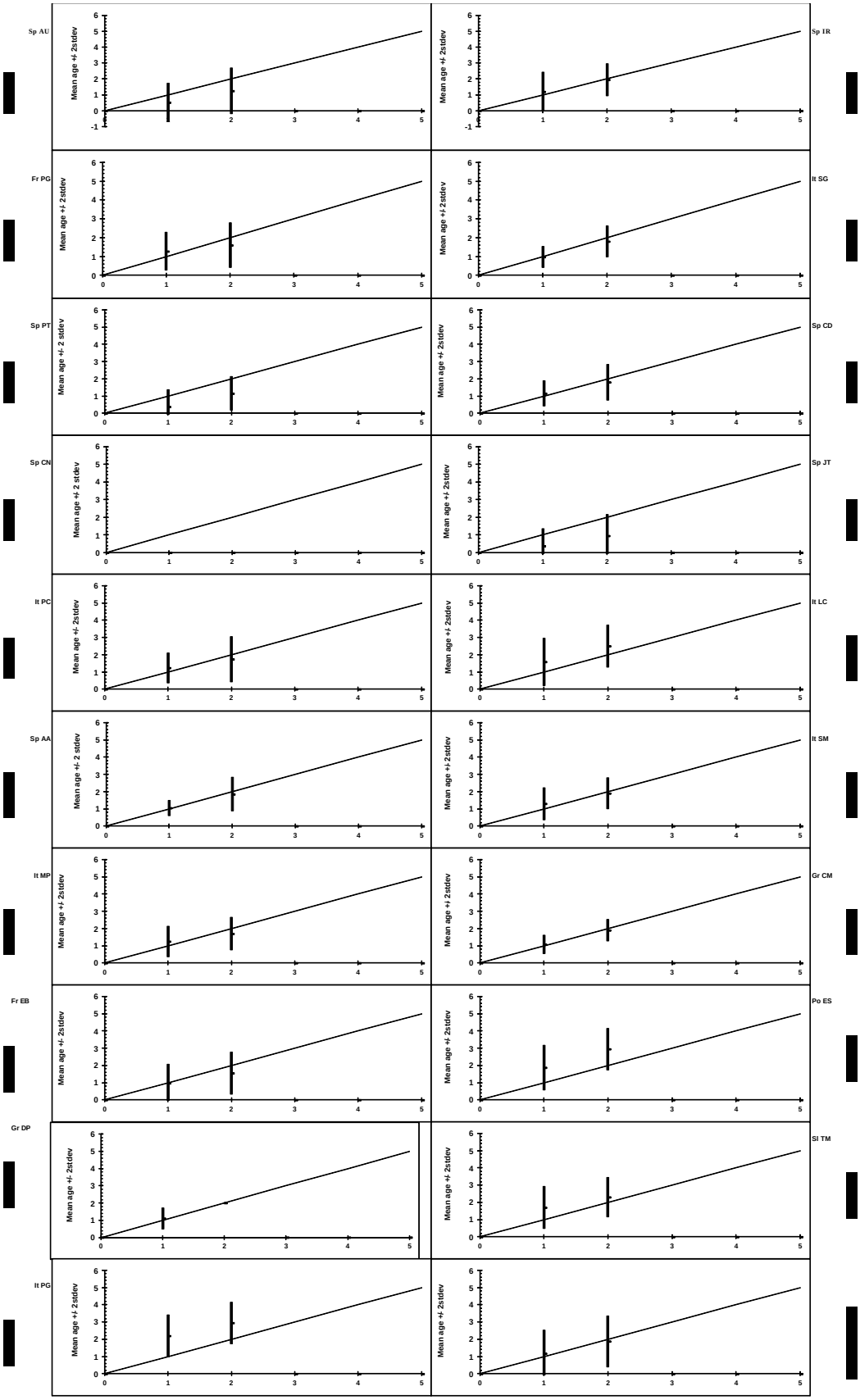

Figure 3.6.2. ANE_GSA06: Age bias plots with the mean age recorded +/- 2stdev of each age reader and all readers plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

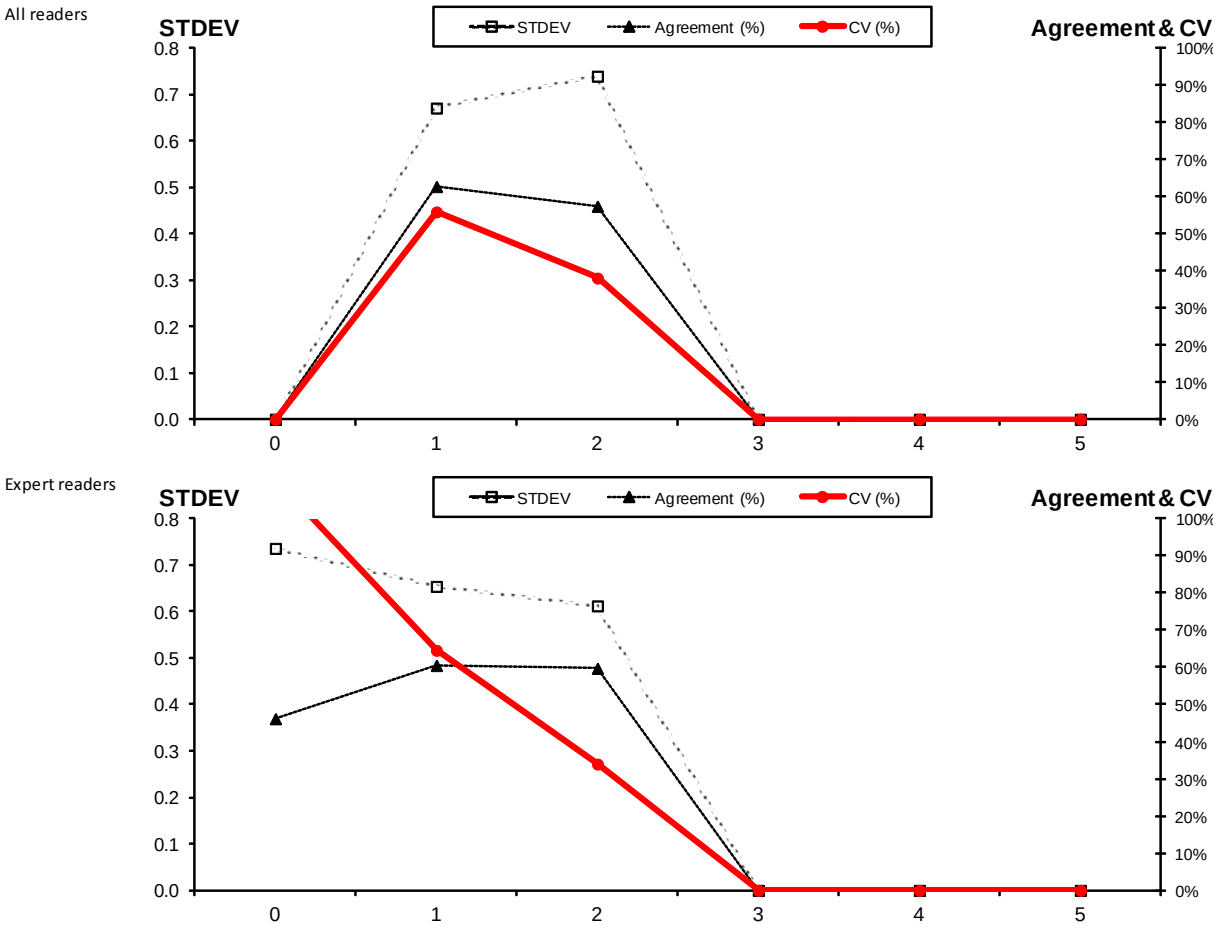

Figure 3.6.3. ANE_GSA06: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 7 GULF OF LION (ANE_GSA07)

Overall age reading results are shown Annex 1. From the total of 38 pictures of anchovy otoliths 15 readers analyzed all images and three readers 37 images.

Table 3.7.1 and Figure 3.7.1 shows the % agreement and CV by readers group. Overall agreement is 73 % (Table 3.7.1). Only modal ages 1 and 2 have been shown, reaching a similar agreement in the two ages (77% and 69% respectively). The other two groups of readers, experts and intermediate & training groups reach similar agreements than all readers.

Only one reader read usually anchovy otoliths in this area, and therefore it has not been possible to create the group of GSA07 readers.

The analysis including all age readers revealed a high overall coefficient of variation (CV) of 31.3% (Table 3.7.1 and Figure 3.7.1), also similar to the other two groups of readers. Overall CV for the expert readers group was 30.3%, and for the intermediate & training group was 34.1%. For all groups show similar high CV in the age 1 and 2 years old between 22-45%.

Figure 3.7.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen mainly underestimating ages 2 in most readers. As the overall agreement between readers is low and similar with the two ages (1&2) represented in this area, the standard deviations are also higher and similar for the two ages for all readers combined (Figure 3.7.3) but also looking at the individual readers (Figures 3.7.2).

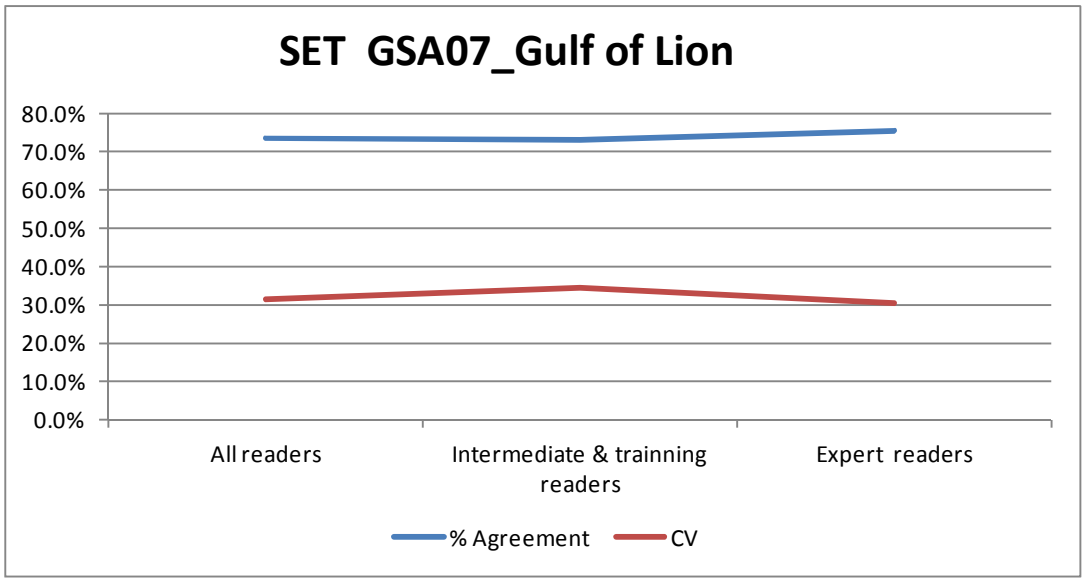

Figure 3.7.1. ANE_GSA07: % agreement and CV by readers group.

Table 3.7.1. ANE_GSA07: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	19	77.4%	36.2%	0.25
2	19	69.4%	26.4%	-0.14
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**38**	**73.4%**	**31.3%**	**0.06**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	24	72.6%	39.4%	0.31
2	14	72.6%	25.0%	-0.03
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**38**	**72.6%**	**34.1%**	**0.19**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	-	-	-	-
1	17	75.8%	40.5%	0.32
2	21	74.5%	22.0%	-0.08
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**38**	**75.1%**	**30.3%**	**0.10**

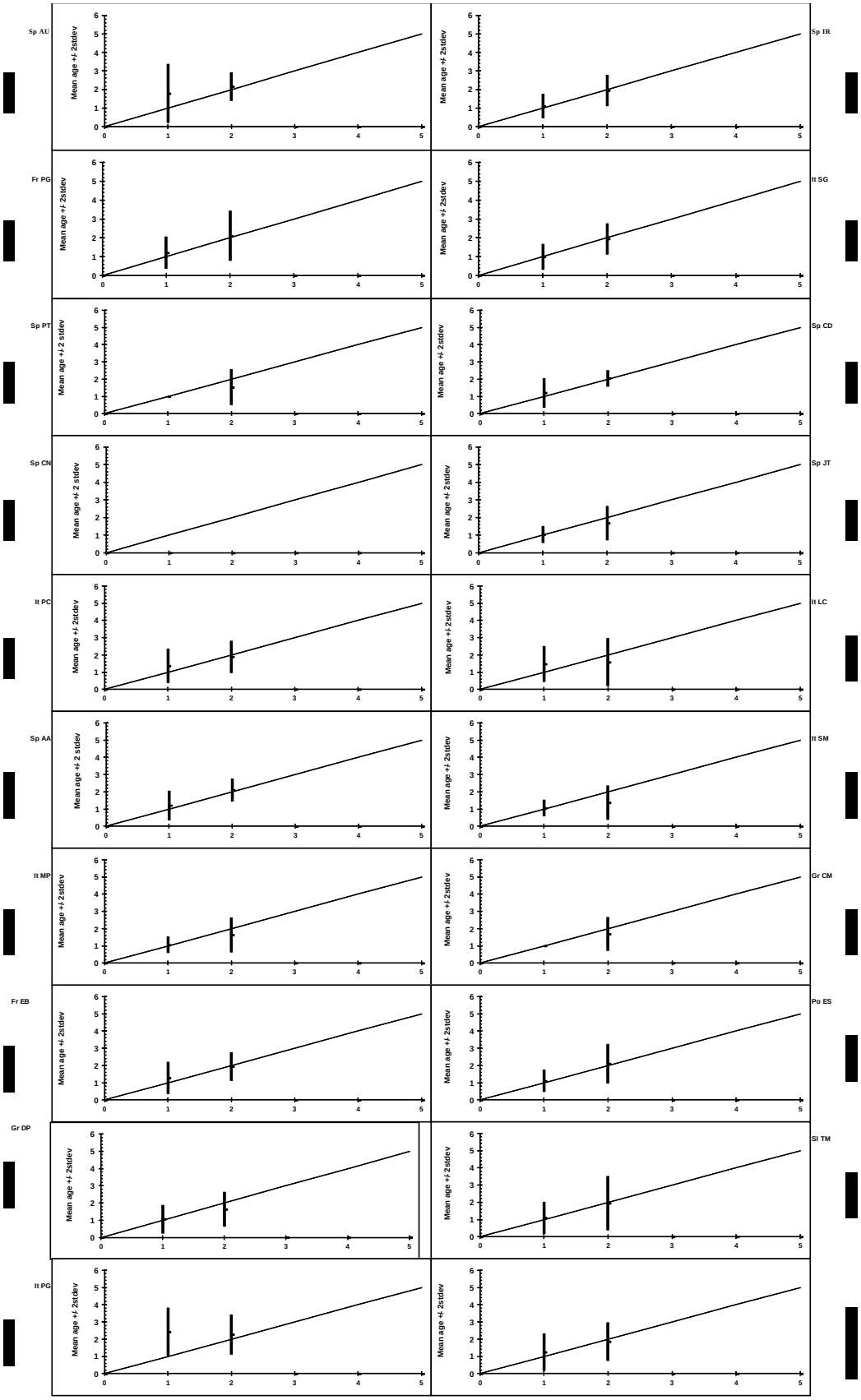

Figure 3.7.2. ANE_GSA07: Age bias plots with the mean age recorded +/- 2stdev of each age reader plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

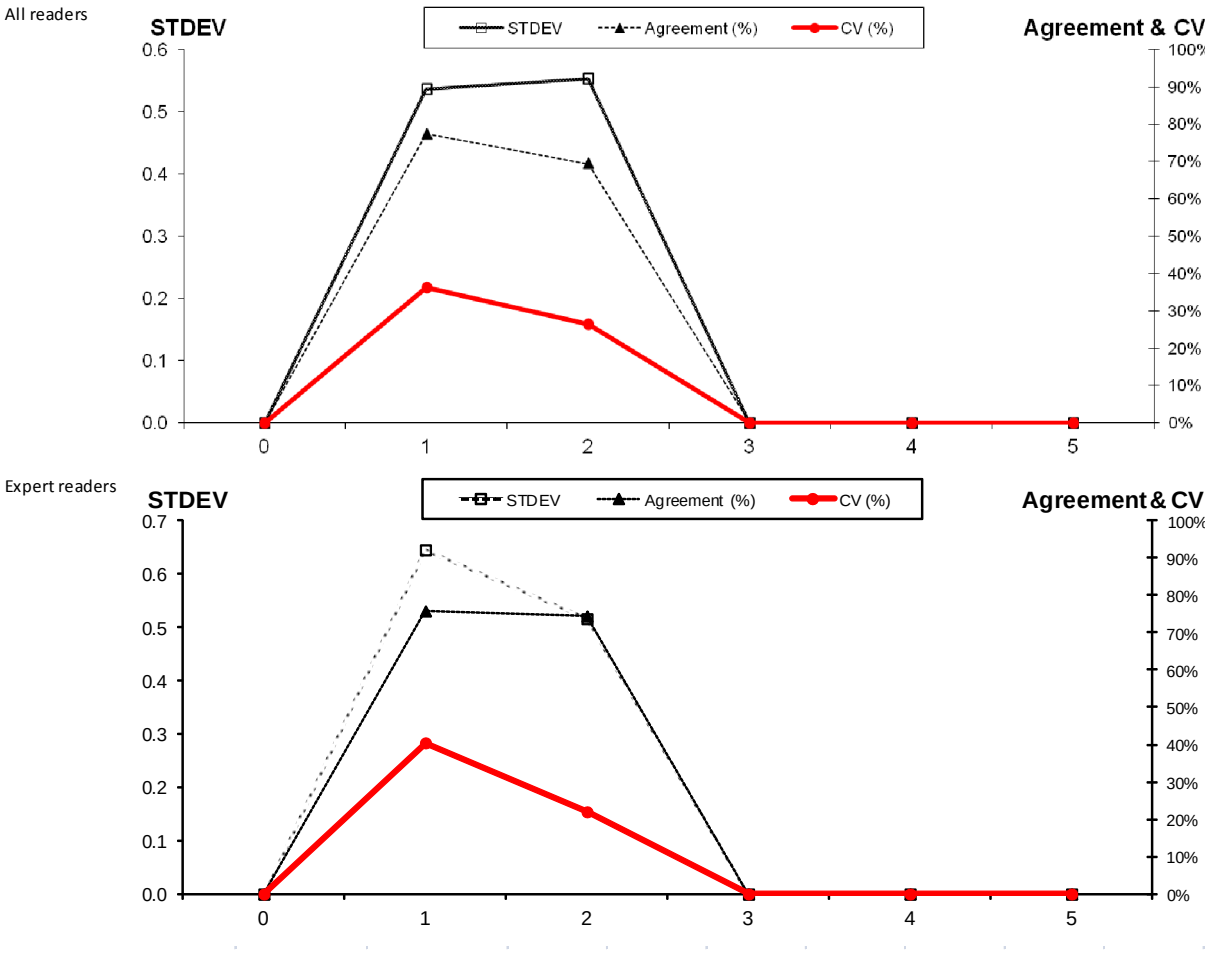

Figure 3.7.3. ANE_GSA07: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 8 SOUTHERN TYRRHENIAN (ANE_GSA10)

Overall age reading results are shown Annex 7. From the total of 55 pictures of anchovy otoliths 15 readers analyzed all images and three readers 54 images.

Table 3.8.1 and Figure 3.8.1 shows the % agreement and CV by readers group. Overall agreement is 62.9 % (Table 3.8.1). The three modal ages (0-2) show a similar % agreement (between 60% and 64%). Not modal age 3 is shown in this area, though the Tyrrhenian readers identified 14 individuals as age 3.

Analysis only done with the Tyrrhenian group (3 readers) shows a overall agreement of 67.3% (Table 3.8.1), analysis of intermediate & training reading group shows an overall agreement of 68.9% higher than the agreement between the expert group (62%). The modal age 3 is shown in the Tyrrhenian group and also in the intermediate & training group, however is not shown in the expert group.

The analysis including all age readers revealed a very high overall coefficient of variation (CV) of 67.2% (Table 3.8.1 and Figure 3.8.1). CV peaked at 129.1% for modal age 0 which was due mostly to six readers who interpreted a number of otoliths as age 1 in opposite to the other readers. For other readers groups also reaches the highest CV at age 0. Overall CV for the Tyrrhenian readers group was 58%, for the expert group was 86.7%, and for the intermediate & training group 51%. The Tyrrhenian readers show lower CV at age 3 (22.5%).

Figures 3.8.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. As the overall agreement between reader is low and similar with the ages 0, 1 & 2 represented in this area , the standard deviations are also higher and similar for the three ages for all readers combined (Figure 3.8.3) but also looking at the individual readers (Figures 3.8.2).

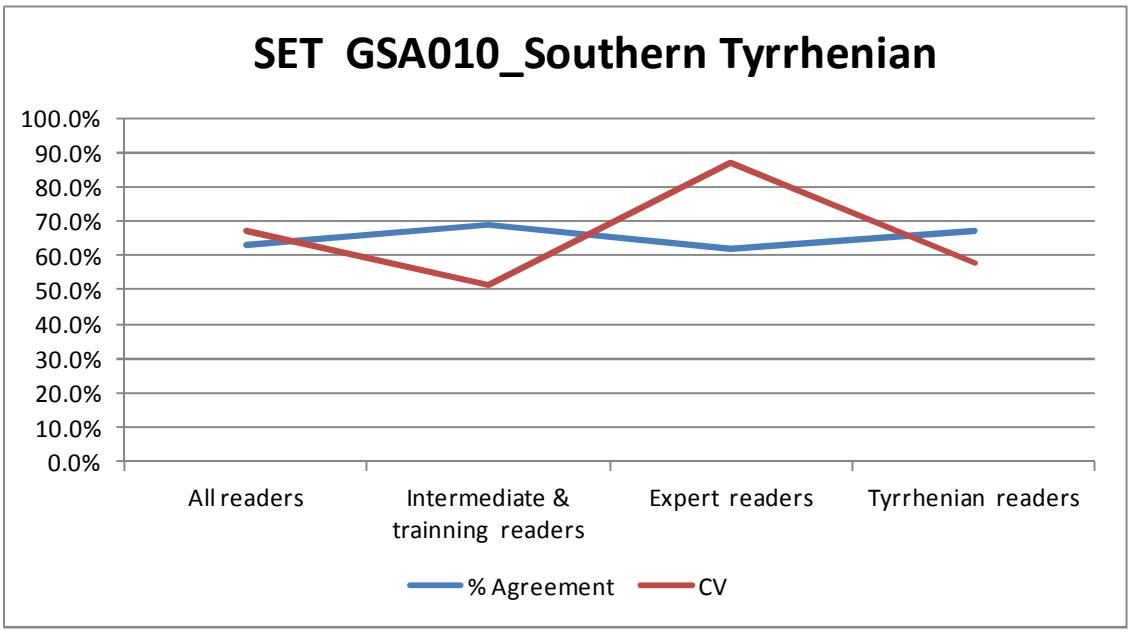

Figure 3.8.1. ANE_GSA10: % agreement and CV by readers group.

Table 3.8.1. ANE_GSA10: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	13	59.7%	129.1%	0.41
1	27	63.8%	57.5%	0.04
2	15	64.1%	31.0%	-0.07
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**55**	**62.9%**	**67.2%**	**0.10**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	8	61.1%	136.4%	0.39
1	31	73.8%	40.4%	0.11
2	15	65.2%	28.6%	0.02
3	1	33.3%	-	-1.00
4	-	-	-	-
5	-	-	-	-
Total	**55**	**68.9%**	**51.2%**	**0.11**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	20	62.9%	147.4%	0.39
1	19	57.9%	71.2%	-0.11
2	16	65.7%	29.2%	-0.15
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**55**	**62.0%**	**86.7%**	**0.06**

Tyrrhenian readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	72.2%	144.3%	0.33
1	25	65.3%	66.8%	-0.08
2	17	66.7%	29.4%	-0.02
3	7	71.4%	22.5%	-0.33
4	-	-	-	-
5	-	-	-	-
Total	**55**	**67.3%**	**58.1%**	**-0.05**

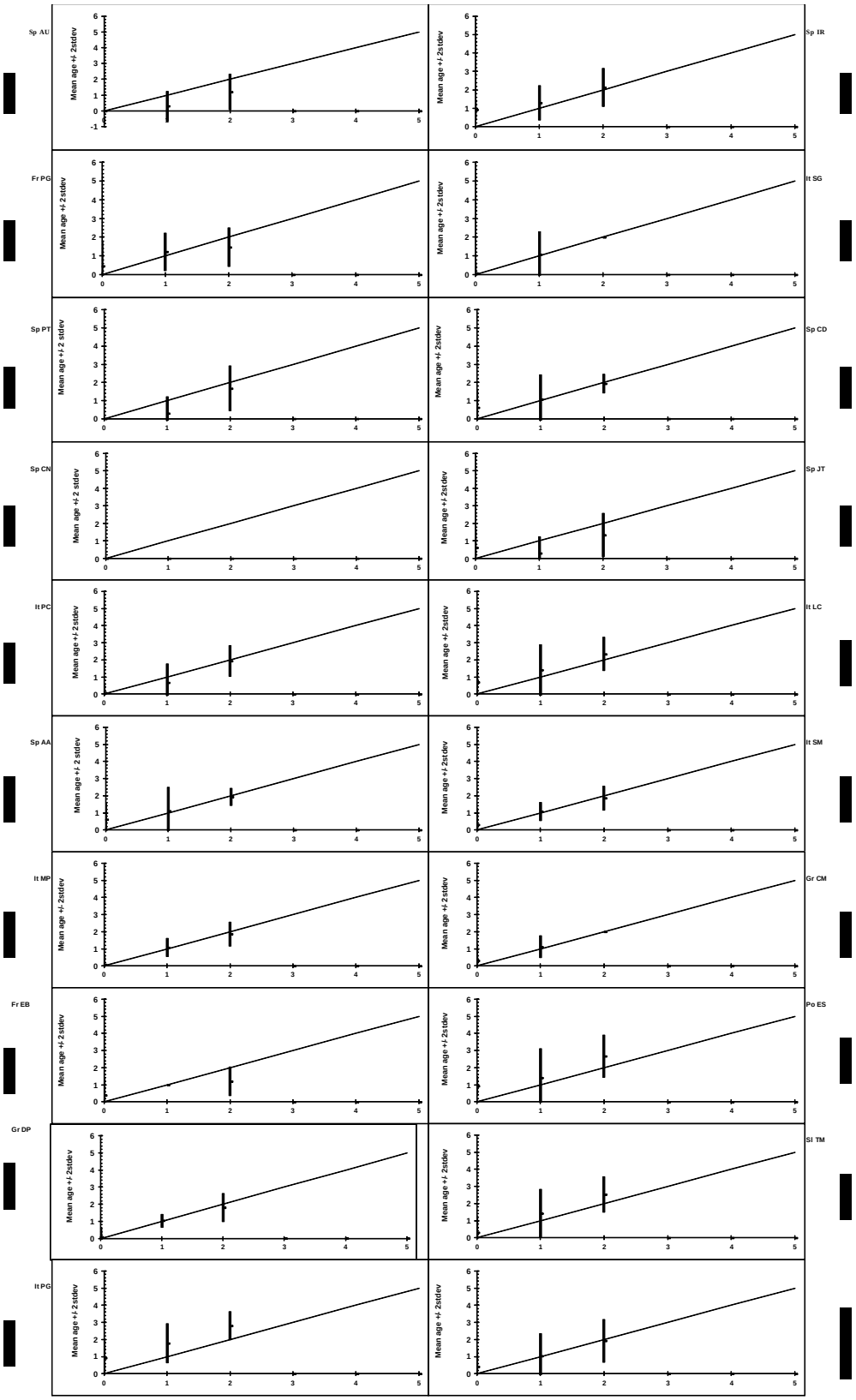

Figure 3.8.2. ANE_GSA10: Age bias plots with the mean age recorded +/- 2stdev of each age reader and all readers plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

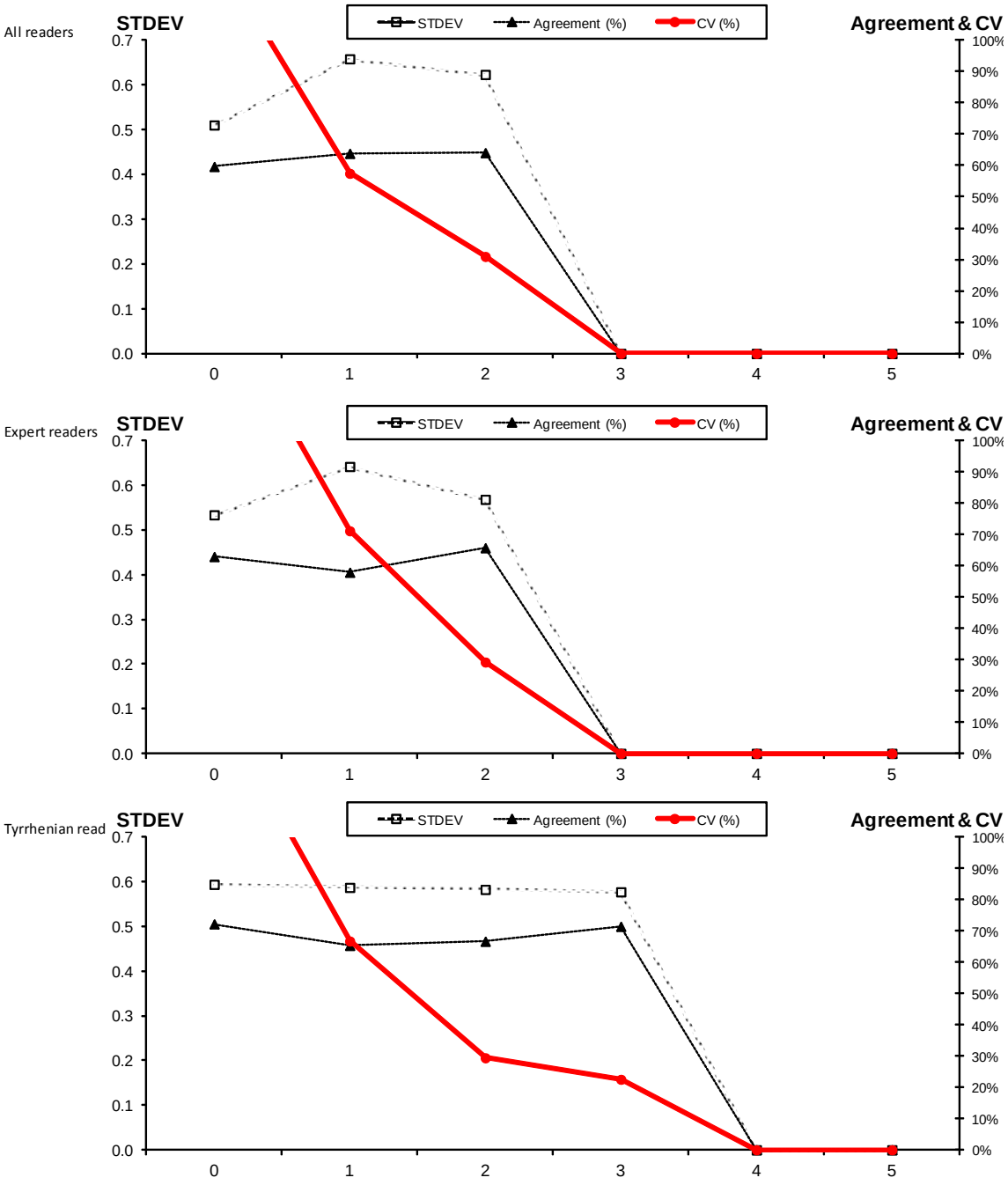

Figure 3.8.3. ANE_GSA10: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 9 STRAIT OF SICILY (ANE_GSA16)

Overall age reading results are shown Annex 1. From the total of 66 pictures of anchovy otoliths 14 readers analyzed all images and four readers between 63-64 images.

Table 3.9.1 and Figure 3.9.1 shows the % agreement and CV by readers group. Overall agreement is 58.5% (Table 3.9.1). The best agreements are reached for age 0 (89.5 %), and for age 1 to 3 agreements are 57.9, 50.5 and 48.6% respectively.

Analysis only done with the Sicilian group (2 readers) shows a higher overall agreement of 85.6% (Table 3.9.1), analysis of intermediate & training reading group shows an overall agreement of 61% slight higher than the agreement between the expert group (60%).

The analysis including all age readers revealed a very high overall coefficient of variation (CV) of 78.7% (Table 3.9.1 and Figure 3.9.1). CV peaked at 362% for modal age 0 which was due mostly to two readers who interpreted a number of otoliths as age 1 in opposite to the other readers. For other readers groups also reach the highest CV at age 0, except for the Sicilian reader group (CV=0%). Overall CV for the Sicilian readers group was 11.2%, for the expert group was 73.8%, and for the intermediate & training group 41%. The Sicilian readers show lower CV at age 0 and 1 (0%).

Figures 3.9.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. As the overall agreement between readers diminishes with age, the standard deviations increase with age, and this is evidence for all readers combined (Figure 3.9.3) but also looking at the individual readers (Figures 3.9.2).

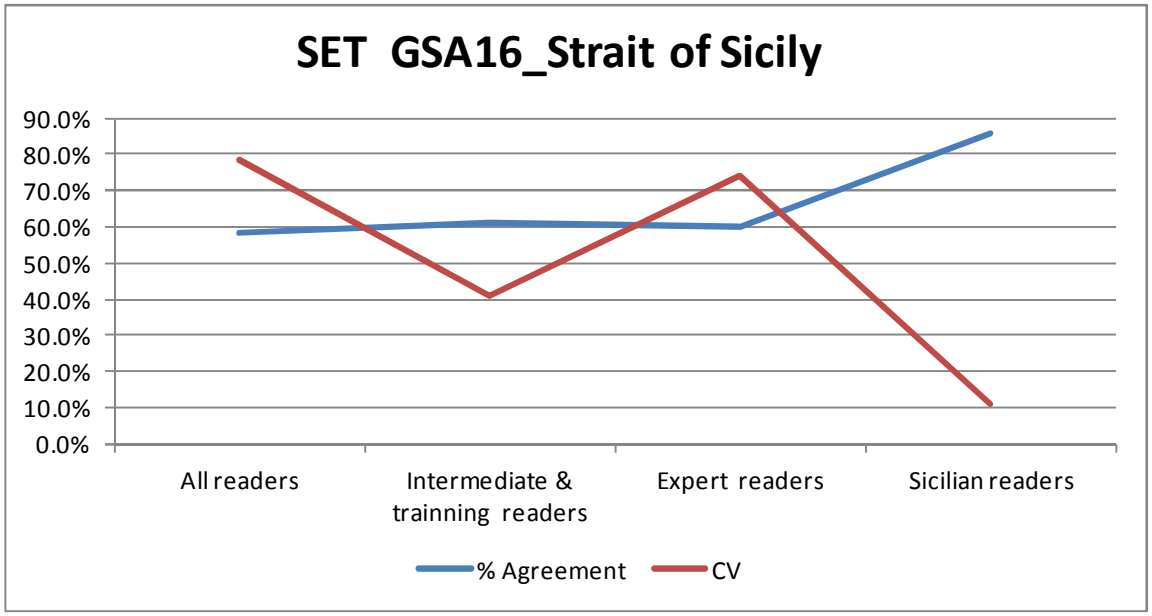

Figure 3.9.1. ANE_GSA16: % agreement and CV by readers group.

Table 3.9.1. ANE_GSA16: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	7	89.5%	362.0%	0.10
1	35	57.9%	50.8%	0.38
2	21	50.5%	37.5%	0.17
3	2	48.6%	29.9%	-0.49
4	-	-	-	-
5	-	-	-	-
Total	**65**	**58.5%**	**78.7%**	**0.26**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	7	92.1%	59.8%	0.08
1	27	64.5%	41.9%	0.47
2	28	52.6%	35.6%	0.23
3	4	41.7%	34.6%	-0.56
4	-	-	-	-
5	-	-	-	-
Total	**66**	**61.0%**	**40.7%**	**0.26**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	9	75.9%	239.8%	0.30
1	37	58.3%	55.1%	0.31
2	17	55.9%	34.2%	-0.07
3	3	53.8%	31.5%	-0.50
4	-	-	-	-
5	-	-	-	-
Total	**66**	**59.9%**	**73.8%**	**0.18**

Sicilian readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	100.0%	0.0%	0.00
1	27	100.0%	0.0%	0.00
2	26	76.9%	20.9%	-0.19
3	6	50.0%	28.3%	-0.50
4	-	-	-	-
5	-	-	-	-
Total	**66**	**85.6%**	**11.2%**	**-0.13**

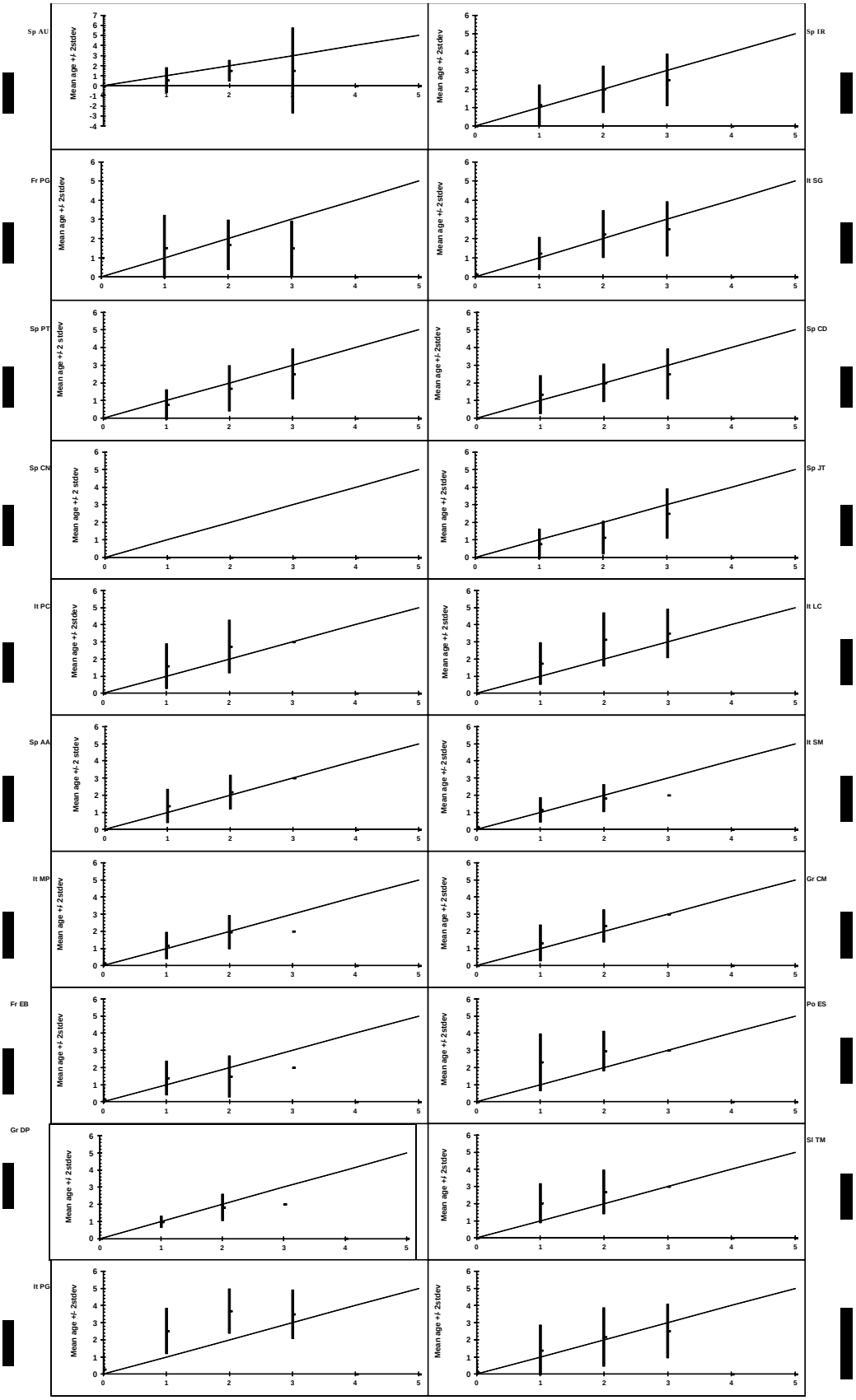

Figure 3.9.2. ANE_GSA16: Age bias plots with the mean age recorded +/- 2stdev of each age reader and all readers plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

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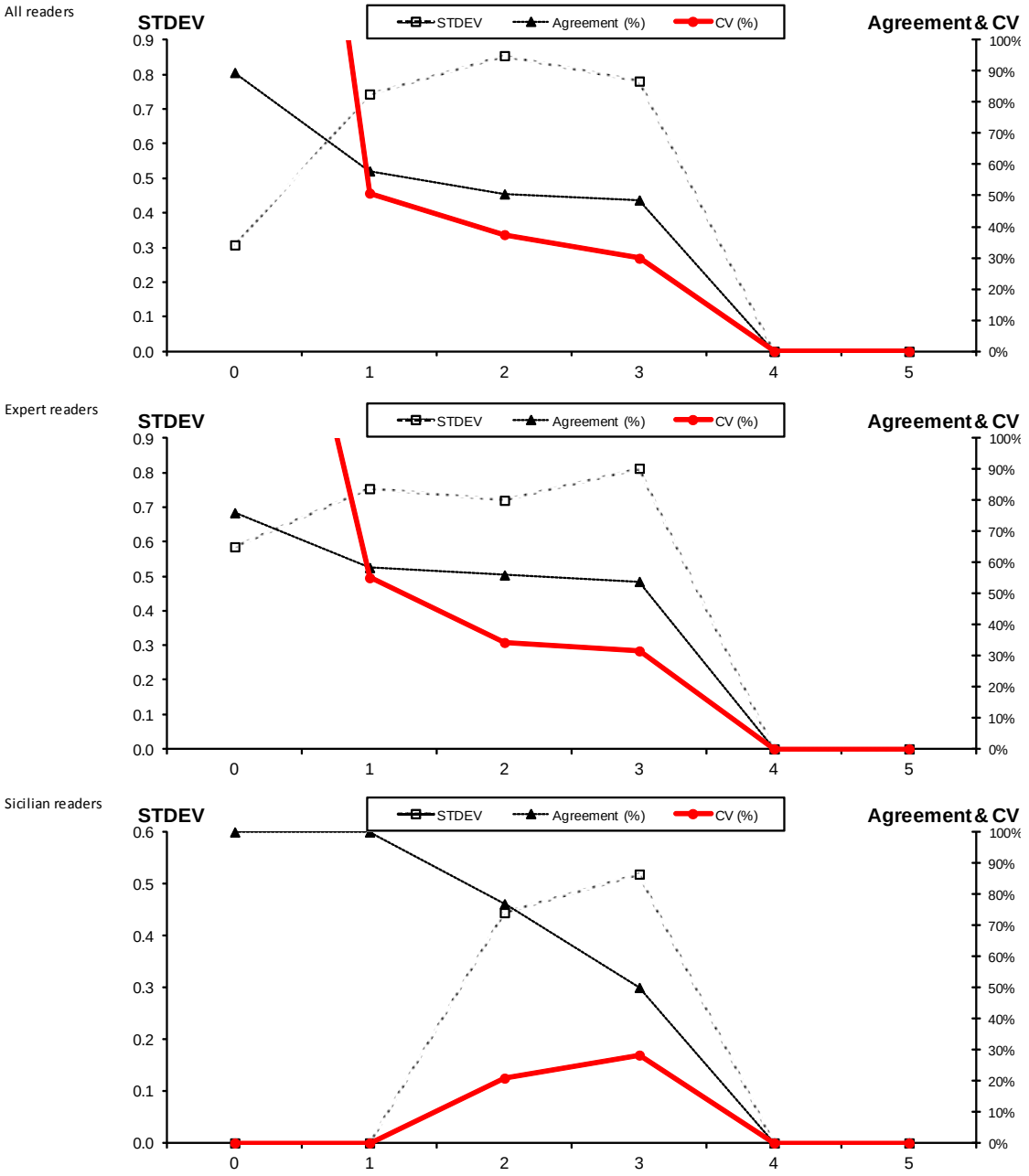

Figure 3.9.3. ANE_GSA16: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 10 WESTERN IONIAN (ANE_GSA19)

Overall age reading results are shown Annex 1. From the total of 55 pictures of anchovy otoliths 15 readers analyzed all images and three readers between 52-54 images.

Table 3.10.1 and Figure 3.10.1 shows the % agreement and CV by readers group. Overall agreement is 61.9% (Table 3.10.1). The agreements are similar for 0 to 2 ages, between 56% and 65%. Not modal age 3 is shown in this area.

Analysis only done with the Ionian group (3 readers) shows a overall agreement of 73.5% (Table 3.10.1), analysis of intermediate & training reading group shows an overall agreement of 68.9% higher than the agreement between the expert group (60%). The modal age 3 is shown in the Ionian group and also in the intermediate & training group, however is not shown in the expert group.

The analysis including all age readers revealed a very high overall coefficient of variation (CV) of 60.9% (Table 3.10.1 and Figure 3.10.1). CV peaked at 141% for modal age 0 which was due mostly to four readers who interpreted a number of otoliths as age 1 in opposite to the other readers. For other readers groups also reach the highest CV at age 0 (between 133-160%). Overall CV for the Ionian readers group was 55.3%, for the expert group was 73.3%, and for the intermediate & training group 50.1%. For all groups show similar high CV in the age 1 to 3 years old between 22-58%.

Figures 3.10.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. As the overall agreement between reader is low and similar with the ages 0, 1 & 2 represented in this area, the standard deviations are also high and similar for the three ages; this evident for all readers combined (Figure 3.10.3) but also looking at the individual readers (Figures 3.10.2).

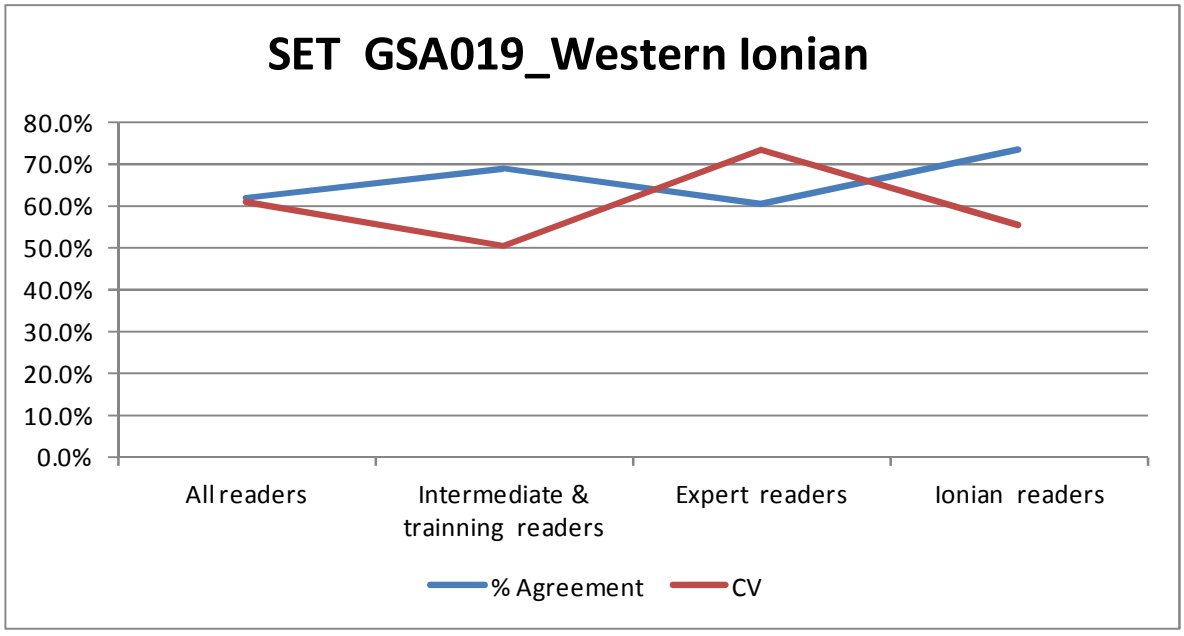

Figure 3.10.1. ANE_GSA19: % agreement and CV by readers group.

Table 3.10.1. ANE_GSA19: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	6	64.8%	141.1%	0.35
1	32	64.7%	58.4%	0.03
2	17	55.7%	37.3%	-0.31
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**55**	**61.9%**	**60.9%**	**-0.04**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	5	68.9%	159.7%	0.31
1	31	72.8%	44.6%	0.11
2	18	63.6%	30.3%	-0.16
3	1	44.4%	-	-0.67
4	-	-	-	-
5	-	-	-	-
Total	**55**	**68.9%**	**50.1%**	**0.03**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	15	59.4%	133.8%	0.44
1	31	62.3%	54.1%	0.13
2	9	54.3%	38.5%	-0.43
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**55**	**60.2%**	**73.3%**	**0.12**

Ionian readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	12	69.4%	158.8%	0.31
1	18	82.4%	26.5%	0.10
2	22	69.7%	27.1%	-0.09
3	3	66.7%	21.7%	-0.33
4	-	-	-	-
5	-	-	-	-
Total	**55**	**73.5%**	**55.3%**	**0.04**

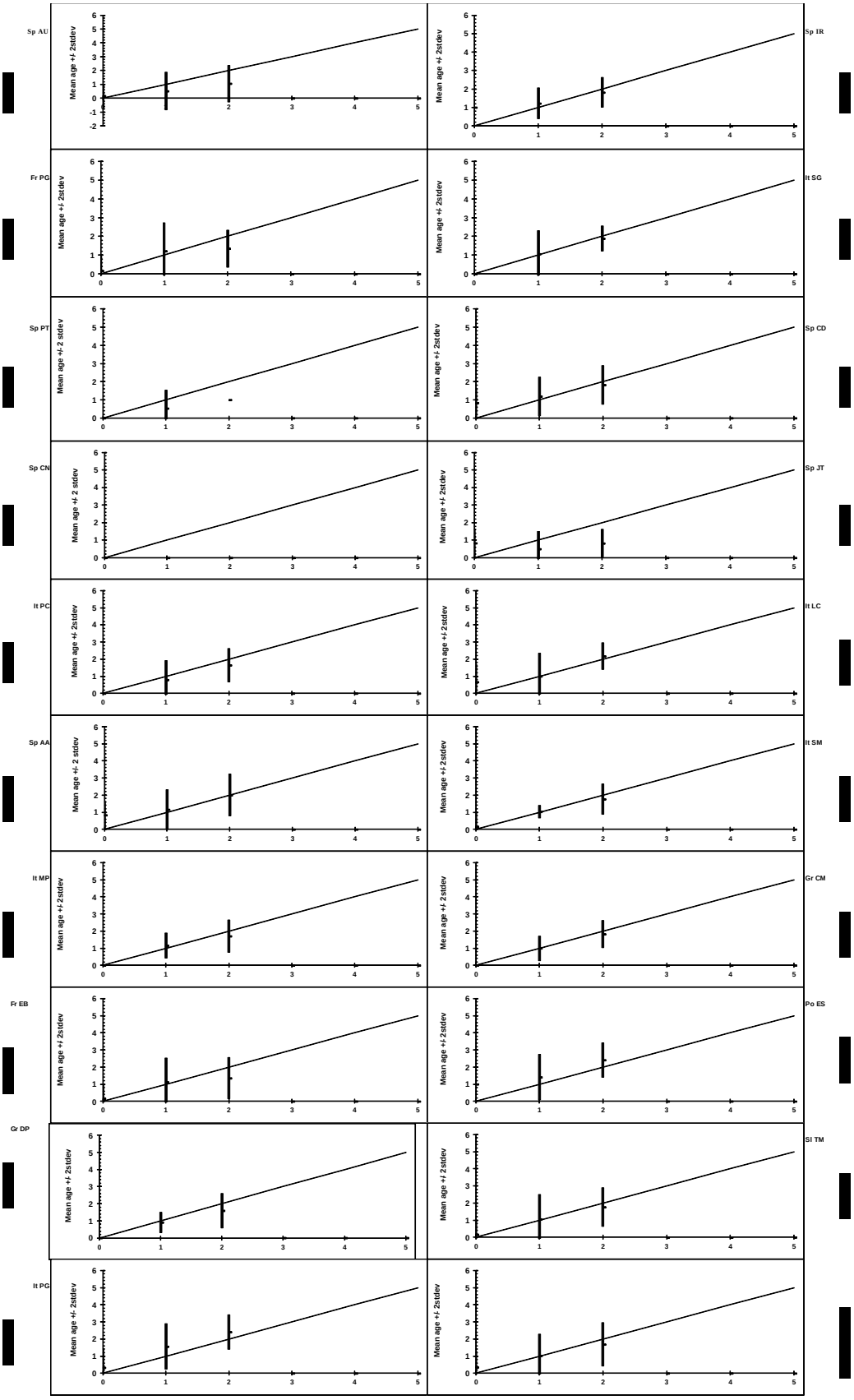

Figure 3.10.2. ANE_GSA19: Age bias plots with the mean age recorded +/- 2stdev of each age reader and all readers plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

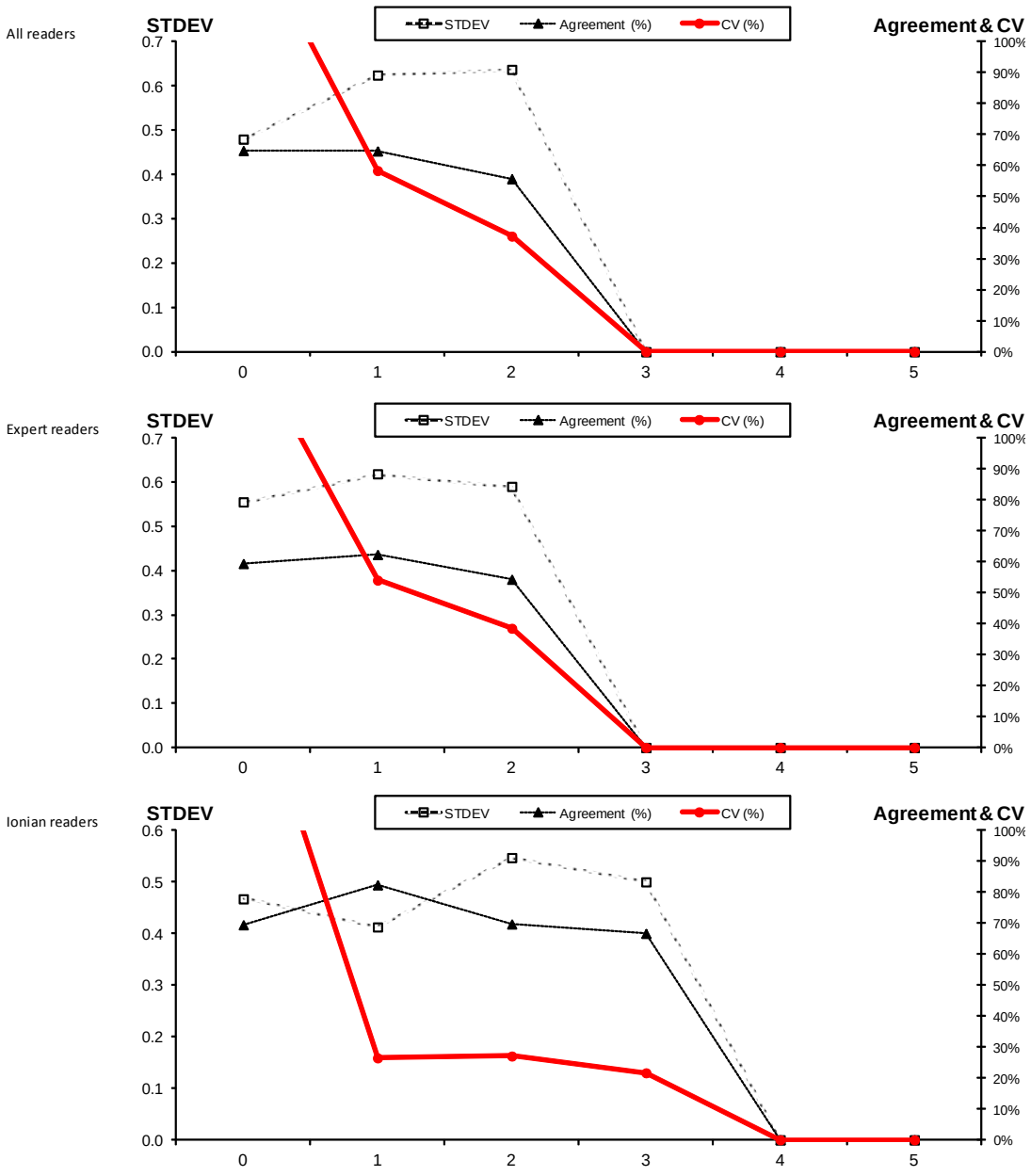

Figure 3.10.3. ANE_GSA19: The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

3. 11 AEGEAN SEA (ANE_GSA22)

Overall age reading results are shown Annex 1. From the total of 70 pictures of anchovy otoliths 16 readers analyzed all images and two readers 66 and 69 images respectively.

Table 3.11.1 and Figure 3.11.1 shows the % agreement and CV by readers group. Overall agreement is 70 % (Table 3.11.1). The agreements are similar for 0 to 2 ages, between 56% and 72%. Not modal age 3 is shown in this area and only one otolith of modal age 2.

Analysis only done with the Aegean group (2 readers) shows a higher overall agreement of 97.1% (Table 3.11.1), analysis referring to experts group shows an overall agreement of 78.3%, and analysis of intermediate & training reading group shows an overall agreement of 67.1%, lower than the agreement between all readers.

The analysis including all age readers revealed a high overall coefficient of variation (CV) of 55.7% (Table 3.11.1 and Figure 3.11.1), also similar to the other two groups of readers. Overall CV for the Aegean readers group was 6.7%, for the expert readers group was 42.8%, and for the intermediate & training group was 71.6%. For all readers groups show similar high CV in the age 1 years old between 40-49%, except for the Aegean group (0% for age 0 and 9.9% for age 1). One otolith only of modal age 2 for all groups.

Figure 3.11.2 shows age bias plots with the mean age recorded and the standard deviation of each age reader and all readers combined plotted against the modal age. Deviations from the modal age (solid line) can be seen for all ages in most readers, some readers overestimating and other readers underestimating. The major discrepancy arose for age 0 which was frequently assigned by the GSA22 group of readers but not by the other readers. As such, the poorest agreement between reader was on 0 age, the standard deviations was the highest for this age; this is evident for all readers combined (Figure 3.11.3) but also looking at the individual readers (Figure 3.11.2).

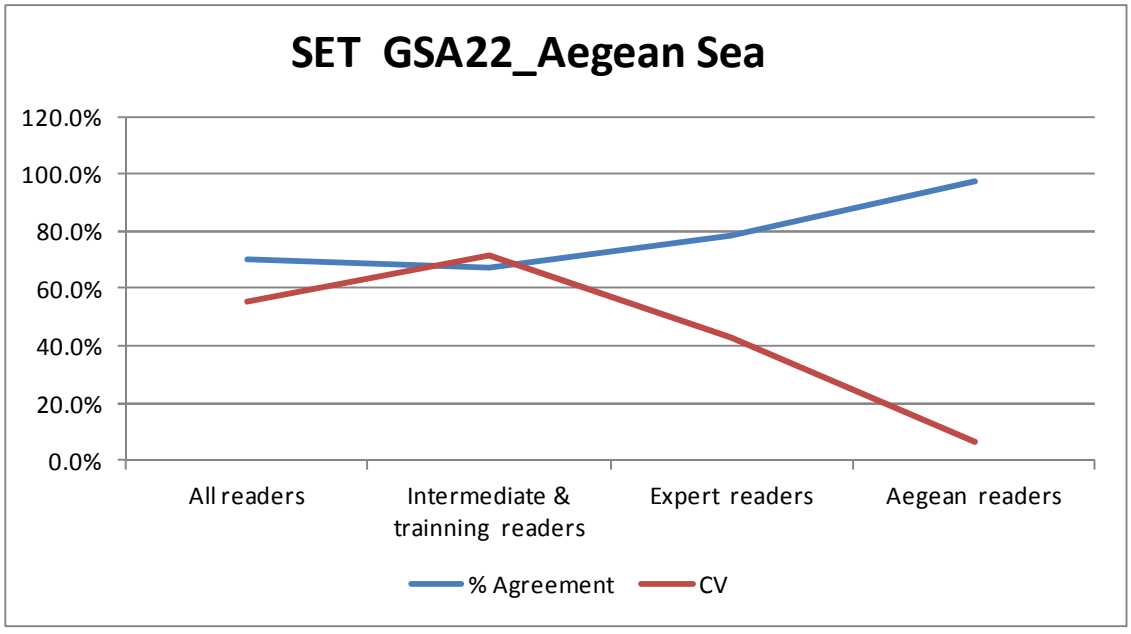

Figure 3.11.1. ANE_GSA22: % agreement and CV by readers group.

Table 3.11.1. ANE_GSA22: Summary of the average percentage of agreement, CV and relative bias by age.

All readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	7	55.6%	117.4%	0.44
1	62	71.8%	49.0%	0.02
2	1	55.6%	-	-0.22
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**70**	**70.0%**	**55.7%**	**0.06**

Intermediate & trainning readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	20	61.7%	136.7%	0.38
1	49	69.5%	45.7%	0.13
2	1	55.6%	-	-0.22
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**70**	**67.1%**	**71.6%**	**0.20**

Expert readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	2	66.7%	150.0%	0.33
1	67	79.0%	39.7%	0.04
2	1	55.6%	-	-0.22
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**70**	**78.3%**	**42.8%**	**0.04**

Aegean readers

Modal Age	Otolith N	% Agreement	CV	Bias
0	26	100.0%	0.0%	0.00
1	43	96.5%	9.9%	-0.03
2	1	50.0%	-	-0.50
3	-	-	-	-
4	-	-	-	-
5	-	-	-	-
Total	**70**	**97.1%**	**6.7%**	**-0.03**

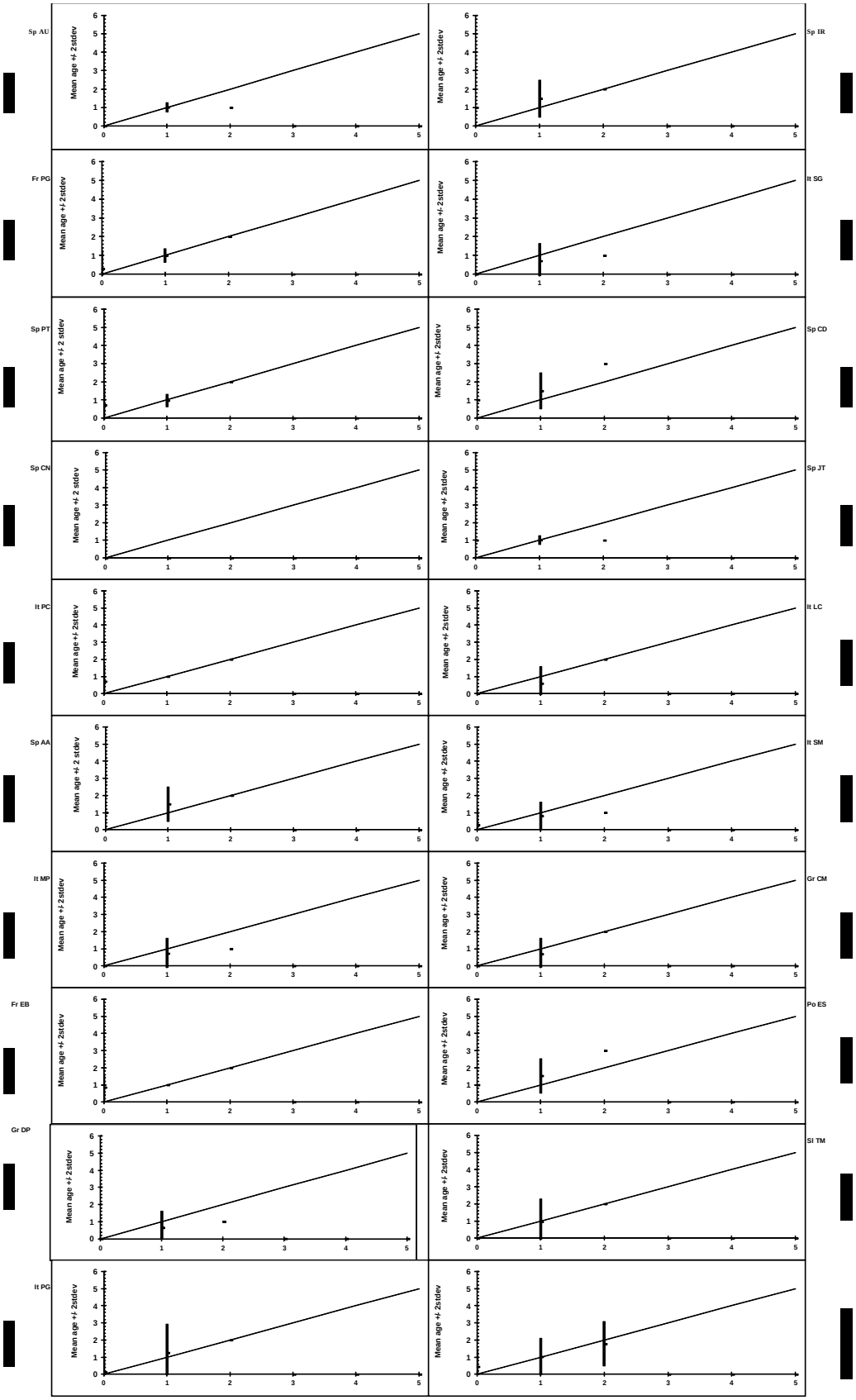

Figure 3.11.2. ANE_GSA22: Age bias plots with the mean age recorded +/- 2stdev of each age reader and all readers plotted against the MODAL age. The estimated mean age corresponds to MODAL age, if the estimated mean age is on the 1:1 equilibrium line (solid line). RELATIVE bias is the age difference between estimated mean age and MODAL age.

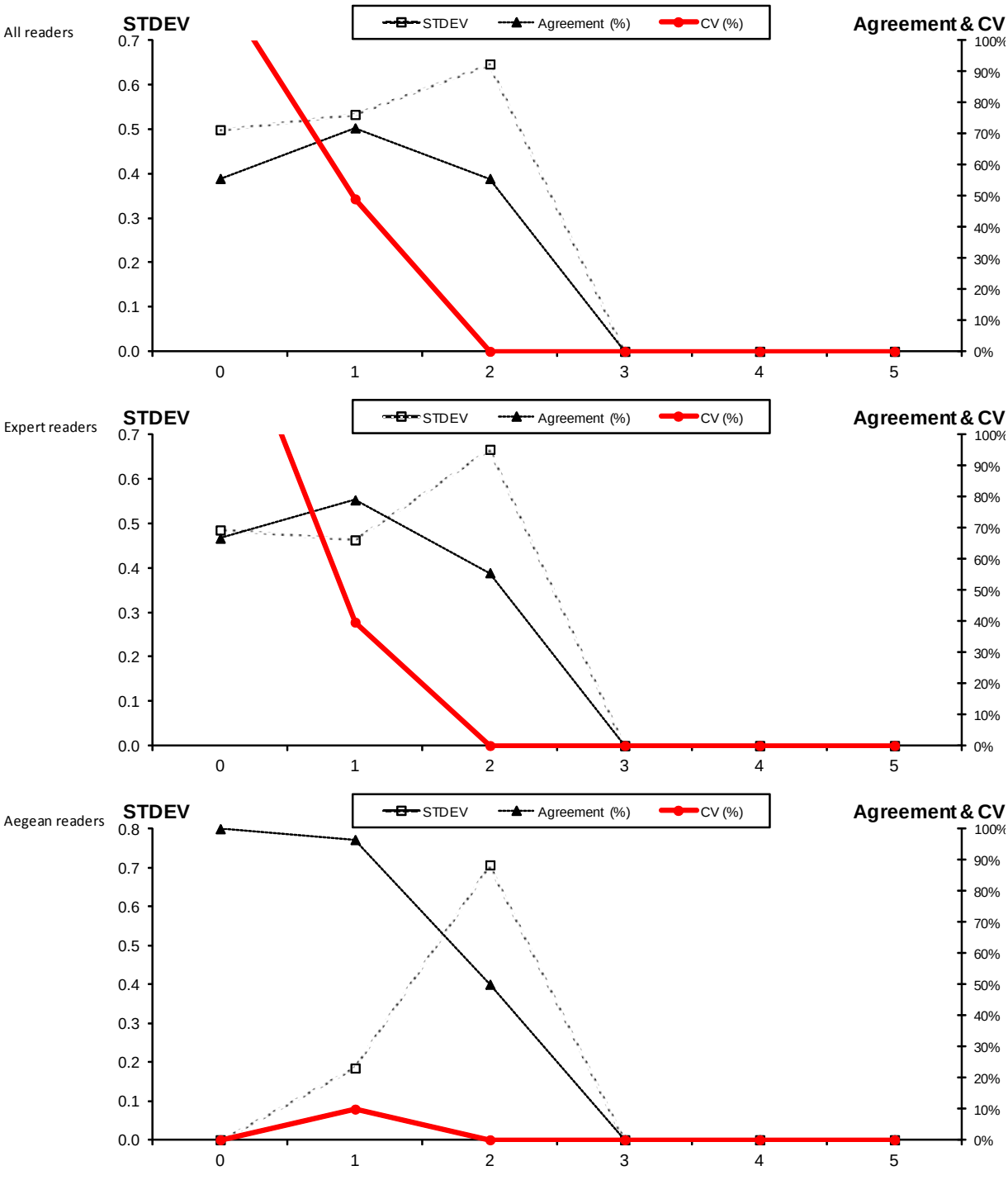

Figure 3.11.3. The coefficient of variation (CV%), percent agreement and the standard deviation (STDEV) are plotted against MODAL age. CV is much less age dependent than the standard deviation (STDEV) and the percent agreement. CV is therefore a better index for the precision in age reading. Problems in age reading are indicated by relatively high CV's at age.

4 DISCUSSION

Within the participating institutes the methods of treatment of the otoliths before reading are relatively well standardized. Most institutes are reading whole otoliths embedded in resin, and some, immersed in water or ethanolic solution (70 %).. In this exchange images of otoliths were used which were treated with the same methods. Exclusively using images has of course the disadvantage that the readers are not able to re-adjust the sharpness on different levels of the otoliths which can make the interpretation more difficult.

The exchange was carried out by using the WebGR application and made the whole exchange process quite easy. All readers became familiar with the use of the tool and it proved to be very useful.

In 2014, for all areas the average percentage of agreement and CV does not seem to be satisfactory. Most of the anchovy otoliths were not well classified by many of the readers during the 2014 exchange. In general, the results of the expert group improved compared to those of intermediate & training group in all areas, except in some areas of the Mediterranean (i.e. Western Mediterranean, Southern Tyrrhenian and Ionian Sea). And the results of the area readers group are better (higher % agreement and lower CV) than the other groups of readers (including expert group), except for the area IXa (quite similar with respect expert group). This may mean that there are different criteria reading between areas, so that when comparing only the readers in their expertise area they are more accurate because they all follow the same criteria reading. Analysis only done with the area readers group shows a higher overall agreement and low CV for Aegean Sea and Bay of Biscay readers. Possibly the success of the readers of the Bay of Biscay, compared with the other sets, is because exchanges and workshops have been conducted since 1990 in this area, and there are sufficient criteria for the interpretation of anchovy otoliths. In the case of Aegean readers which show a great accuracy of its readings, both readers are of the same institute and therefore would have very consistent criteria.

In order to compare this results with WKARA 2009 the analysis is made only by areas as this was the basis of the analysis carried out in WKARA 2009. Six areas were included in this exchange (Bay of Biscay, Gulf of Cadiz, North of Morocco, Alboran Sea, North Adriatic and Gulf of Lion) coinciding with four areas analyzed in 2014 Exchange. WebGR was not used in 2009.

Comparing the results of Exchange 2014 with that of 2009, there has been a small increase of the level of agreement (particularly for IXa) and a decrease of CV in those areas that were analyzed in the two exchanges, as can be seen in the Table 4.1.

Table 4.1. Summary of the average percentage of agreement and CV by sets from 2009 and 2014 Anchovy otolith Exchanges.

		2009		2014	
Set	**Area**	**% Agreement**	**CV**	**% Agreement**	**CV**
ANE_VIII	Bay of Biscay (all readers)	72%	85%	74%	45%
ANE_VIII	Bay of Biscay (BB readers)	89%	13%	91%	11%
ANE_IXa	Gulf of Cadiz& Portugal Coast	58%	68%	69%	49%
ANE_GSA01	Alboran Sea	61%	100%	59%	59%
ANE_GSA07	Gulf of Lion	72%	37%	73%	31%

Only 6 readers of the participants in the 2009 exchange and workshop were also participating in the current exchange of 18 participants. However, the results of the recent exchange show no decline of agreement but a slight improvement in all areas, especially in the IXa, and a significant improvement in the CV (lower variability) in all areas.

Looking at the age compositions estimated by each age reader for the whole group (Table 4.2) it can be clearly seen that some readers are interpreting the age structure of anchovy distinctly from the majority of readers. There seems to be a difference of criteria among some readers of the Mediterranean and the Atlantic areas. In particular there seems to be a difference of criteria among some readers (Mediterranean Readers 9, 10, 18 & 19 and Atlantic Reader 16) which tend to age older the fishes than the rest of the readers.

Table 4.2. The age composition estimated by each reader and all age reader combined by areas and total

Total areas

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	160	32	50	81	130	50	134	64	63	46	48	63	69	41	30	75	66	36	**1238**
1	294	329	343	277	340	294	374	254	207	291	320	296	315	268	195	342	185	89	**5013**
2	92	187	156	190	93	208	60	186	189	213	202	208	176	153	217	154	236	204	**3124**
3	25	26	24	27	13	21	7	50	73	25	6	8	16	41	116	5	81	197	**761**
4	-	-	1	-	-	-	-	5	10	-	-	-	-	2	15	-	6	46	**85**
5	-	-	-	-	-	-	-	-	1	-	-	-	-	-	3	-	-	1	**5**
0-5	**571**	**574**	**574**	**575**	**576**	**573**	**575**	**559**	**543**	**575**	**576**	**575**	**576**	**505**	**576**	**576**	**574**	**573**	**10226**

ANE_VII

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	10	10	10	8	10	9	10	10	-	9	2	7	9	10	8	8	7	-	**137**
1	7	4	9	3	3	4	5	7	10	4	8	5	3	-	3	4	2	3	**84**
2	3	5	1	6	7	6	5	2	4	6	8	5	8	4	5	8	5	6	**94**
3	-	1	-	3	-	1	-	-	5	1	2	3	-	3	3	-	3	4	**29**
4	-	-	-	-	-	-	-	-	1	-	-	-	-	2	1	-	3	5	**12**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	**2**
0-5	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**19**	**20**	**20**	**20**	**20**	**20**	**19**	**20**	**20**	**20**	**20**	**358**

ANE_VIII

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	5	5	5	7	6	4	6	6	4	5	7	8	6	3	7	6	6	2	**98**
1	29	25	30	19	29	30	38	13	12	31	21	20	28	17	24	24	13	4	**407**
2	21	27	27	35	26	22	20	32	40	22	41	41	31	27	27	35	33	11	**518**
3	15	13	8	9	9	12	6	17	13	12	1	1	5	11	12	5	17	40	**206**
4	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	12	**14**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**70**	**70**	**70**	**70**	**70**	**68**	**70**	**68**	**70**	**70**	**70**	**70**	**70**	**58**	**70**	**70**	**70**	**69**	**1243**

ANE_IXa

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	7	6	5	11	6	8	6	6	6	7	4	7	6	6	7	5	7	2	**112**
1	72	72	56	56	66	51	77	36	45	45	48	44	60	23	23	66	19	12	**871**
2	12	14	27	25	20	32	9	34	28	40	39	39	26	40	49	21	52	34	**541**
3	1	-	3	-	-	1	-	15	13	-	1	1	-	12	12	-	14	36	**109**
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	8	**9**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**92**	**92**	**91**	**92**	**92**	**92**	**92**	**91**	**92**	**92**	**92**	**91**	**92**	**81**	**92**	**92**	**92**	**92**	**1642**

ANE_GSA01

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	37	7	15	3	19	17	32	6	-	13	-	-	7	-	6	5	3	-	**170**
1	29	50	44	27	41	42	35	33	18	45	35	32	36	2	20	48	33	8	**578**
2	4	12	10	31	9	10	2	25	21	12	32	34	26	10	20	17	22	23	**320**
3	-	1	1	9	1	-	-	3	7	-	3	4	1	14	16	-	10	31	**101**
4	-	-	-	-	-	-	-	1	2	-	-	-	-	2	5	-	1	7	**18**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	**3**
0-5	**70**	**70**	**70**	**70**	**70**	**69**	**69**	**68**	**48**	**70**	**70**	**70**	**70**	**28**	**70**	**70**	**69**	**69**	**1190**

Table 4.2. Cont.

ANE_GSA06

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	23	4	-	2	26	-	29	1	-	-	-	-	-	6	-	-	-	-	**91**
1	29	27	39	41	30	39	28	33	15	42	31	36	39	37	11	36	15	4	**532**
2	7	27	19	17	4	20	3	22	22	17	28	24	21	14	27	24	37	28	**361**
3	1	2	2	-	-	1	-	1	11	1	1	-	-	1	19	-	7	25	**72**
4	-	-	-	-	-	-	-	-	1	-	-	-	-	-	3	-	1	3	**8**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**57**	**49**	**60**	**60**	**60**	**60**	**58**	**60**	**60**	**60**	**60**	**1064**

ANE_GSA07

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1	-	**3**
1	8	19	17	19	28	15	24	15	20	15	30	25	25	15	19	23	20	3	**340**
2	23	18	18	17	10	22	14	22	16	20	8	13	13	21	15	14	14	18	**296**
3	7	1	2	1	-	1	-	1	2	2	-	-	-	1	4	-	2	16	**40**
4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	**2**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**38**	**37**	**38**	**38**	**38**	**37**	**38**	**38**	**38**	**37**	**681**

ANE_GSA10

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	32	1	8	15	33	10	25	22	5	10	9	12	9	8	2	12	11	2	**226**
1	18	32	34	18	11	24	24	19	26	23	31	28	28	44	31	30	16	18	**455**
2	4	19	12	21	11	21	6	13	16	22	15	15	18	3	8	13	18	21	**256**
3	-	3	1	-	-	-	-	1	8	-	-	-	-	-	13	-	9	14	**49**
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	**1**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**54**	**55**	**55**	**54**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**54**	**55**	**987**

ANE_GSA16

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	23	9	1	6	15	8	16	7	7	7	6	6	7	6	7	8	7	5	**151**
1	26	31	33	30	36	24	44	17	12	23	35	33	25	34	6	38	5	4	**456**
2	13	19	25	22	12	30	5	24	24	29	25	25	24	23	18	20	33	15	**386**
3	1	6	6	8	3	4	1	12	16	7	-	2	10	1	30	-	19	25	**151**
4	-	-	-	-	-	-	-	4	6	-	-	-	-	-	5	-	2	16	**33**
5	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	**2**
0-5	**63**	**65**	**65**	**66**	**66**	**66**	**66**	**64**	**66**	**66**	**66**	**66**	**66**	**64**	**66**	**66**	**66**	**66**	**1179**

ANE_GSA19

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	26	-	10	11	21	3	20	14	9	4	5	6	8	11	1	9	11	4	**173**
1	21	34	28	22	34	31	35	25	22	29	36	32	31	29	25	36	25	19	**514**
2	7	20	16	22	-	20	-	13	21	19	14	17	16	14	20	10	17	22	**268**
3	-	-	1	-	-	1	-	-	3	3	-	-	-	1	9	-	2	10	**30**
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**54**	**54**	**55**	**55**	**55**	**55**	**55**	**52**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**55**	**985**

ANE_GSA22

	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	
Age	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	**TOTAL**
0	7	-	6	25	4	-	-	2	32	-	17	24	26	1	-	29	20	21	**214**
1	62	39	62	45	65	38	69	63	37	38	53	46	43	67	36	41	39	17	**860**
2	1	31	2	-	1	31	1	1	1	32	-	-	1	1	33	-	10	32	**178**
3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	**3**
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
0-5	**70**	**70**	**70**	**70**	**70**	**70**	**70**	**66**	**70**	**70**	**70**	**70**	**70**	**69**	**70**	**70**	**70**	**70**	**1255**

The reasons that might explain the agreement and discrepancies appearing in the exchange may be: a) Difficulties in differentiating between true annual rings and false rings (or checks), b) Insufficient typical annual growth pattern recognition and insufficient criteria regarding the otolith edge that can be expected to be seen along the year. The ultimate reasons of the discrepancies have not yet been examined in individual otolith cases of disagreement and their examination is left for the coming workshop, although in Annex 2 show images of different otoliths with the age annotations of all readers by area. In each area, one figure as an example for a 100% or >80% agreement, other figure is an example for a medium high agreement (60-74%, annotation) and the third figure are examples for low agreements (<50%); the other figures were chosen to show otoliths with a modal age given by the area readers group, not being endorsed by the most experienced readers of other areas.

Analyzing the images in general, the difficulties described above can be seen. In addition it is observed that the different conventional birth dates between areas (in the Atlantic in January and in the

Mediterranean in June or July) produces some difficulties for some readers (including expert readers) in determining the ages (mainly at ages 0) when the reader changes the conventional birthday which is accustomed (eg. Western Ionian and Aegean Sea Figures in the Annex 2).

Overall, there is certainly room for improvement both in terms of consistency and agreement between readers. More effort needs to be put into the anchovy age determination criteria.

Anchovy is not an easy species for age determination. As widely distributed fish species it lives in different areas with very different environmental and feeding conditions (see Section 4.1 of the WKARA 2009 report). These factors might be the reason for both seasonal and spatial differences/changes in the otolith morphology. This may also induce differences in the seasonal edge formation and appearance between areas and might lead to the different occurrence of false or split rings which can also lead to disagreements in interpretation of otoliths.

Age determination is an essential feature in fish stock assessment to estimate the rates of mortalities and growth. In fact, many assessment Working Groups (ICES, 2014b; GFCM-FAO, 2014), using analytical age-based assessment models and including different tuning series, rely on age disaggregated data.

There is analytical assessment for all anchovy stocks, except in the areas VII, IXa and GSA10. In Division IXa and GSA10 no analytical assessment is made yet (trend based in qualitative assessment), but it is presumed that will be made in a short time. In Table 4.3 we can see the agreements and CVs between the readers contributing to the age structures inputting the assessments and the modal ages from the expert group readers for each stock. Major disagreements between the latter and the local area readers for stock assessment could be a matter of concern for the potential of arising from hidden biases impacting the assessments and certainly would deserve further analysis. The agreement between Bay of Biscay assessment readers and modal age is above 84%; Reader 15 which is a new reader for the assessment of this stock (she has only read anchovy for a year) has an agreement of 88%. The agreement between IXa assessment readers and modal age is very variable between readers, of 94% and 38%. Nevertheless reader 8 (with an agreement of 94%) reads the inputs for the Gulf of Cadiz (IXa South), which is the most important fishing area in IXa and the only for which an assessment is carried out (ICES, 2014b); Whilst reader 16 has only read anchovy otoliths for a year, mainly from western part of Subdivision IXa. For the Alboran Sea and Western Mediterranean areas there is single local reader achieving an 81% of agreement for the Alboran Sea, but dropping to only 43% for Western Mediterranean. For the assessment of the Gulf of Lion stock, there is also a single local area reader; though she has only read anchovy for a year, she shows an agreement of 78%. The agreement between Strait of Sicily assessment readers and modal age of the expert group is below 70%; reader 12 & 13 are reading for assessment, though they have only read anchovy for a year (agreement of 68 & 67% respectively) they showed a high internal cross consistency (86% of agreement between them). For the Southern Tyrrhenian and Western Ionian areas there is single local assessment reader achieving an 80% and 89% of agreement for these areas respectively. The agreement between Aegean Sea assessment readers and modal age is below 70%; reader 14 & 17 are reading for assessment, though they have only read anchovy for a year (agreement of 65 & 60% respectively) and have an very high internal consistency of 97% (both from the same institute).

In general, under a few exceptions in some stock, it seems that the experience of readers determines the interpretation they make of the otolith structure and the level of agreement achieved with the rest of expert readers. It is therefore recommended, as far as possible, that only the age readings of the most expert readers are used for the assessment inputs and second that new readers pass a training processes from validated set of otoliths of the area they have to work with. Production of a collection of age validated otoliths by areas (or at least of agreed age determination by experts) is recommended for the purposes of helping in the training of new age readers. And finally it is also recommended to have regular exchanges, both internally and externally, to learn and to improve the agreements between readers across and within areas.

Table 4.3. Percentage of agreement and CV between the readers and modal age by stock. Modal age corresponds to the modal age of expert readers (expert readers in orange). Cells in green correspond to the assessment readers for each stock.

Modal age of Expert Readers

Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19

ANE_VII: English Channel

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	85.0%	95.0%	75.0%	65.0%	95.0%	85.0%	95.0%	84.2%	5.0%	85.0%	30.0%	50.0%	85.0%	63.2%	60.0%	80.0%	45.0%	0.0%	65.6%
CV	11.0%	5.7%	10.5%	120.2%	8.0%	171.8%	6.7%	10.3%	10.8%	171.8%	33.0%	96.7%	165.8%	13.6%	122.8%	113.1%	103.3%	26.3%	127.6%
RANKING	4	1	6	12	2	6	2	5	14	6	15	12	9	11	15	10	17	18	

ANE_VIII: Bay of Biscay (in green B&B assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	90.0%	90.0%	84.3%	75.7%	90.0%	91.2%	75.7%	73.5%	51.4%	94.3%	54.3%	51.4%	82.9%	87.9%	74.3%	77.1%	57.1%	20.3%	73.3%
CV	10.3%	18.7%	21.0%	27.8%	16.9%	15.7%	18.8%	25.4%	39.7%	7.4%	30.6%	33.2%	20.8%	19.0%	35.6%	25.4%	33.3%	26.6%	45.1%
RANKING	1	3	8	7	5	3	11	13	18	1	14	15	10	6	11	9	16	17	

ANE IXa: Gulf of Cadiz & Portugal coast (in green IXa assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	91.3%	94.6%	73.9%	81.5%	94.6%	67.4%	93.5%	58.2%	52.2%	60.9%	60.9%	65.9%	85.9%	38.3%	38.0%	90.2%	33.7%	14.1%	66.6%
CV	36.7%	16.3%	51.9%	35.7%	18.6%	53.4%	5.2%	55.8%	46.9%	50.7%	38.6%	44.6%	42.3%	47.7%	51.1%	39.2%	47.6%	35.2%	48.9%
RANKING	4	1	10	5	2	11	3	16	13	12	8	9	7	15	18	6	17	14	

ANE GSA01: Alboran Sea (in green GSA01 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	57.1%	80.0%	51.4%	44.3%	81.4%	82.6%	60.9%	64.7%	27.1%	77.1%	50.0%	47.1%	61.4%	0.0%	30.0%	62.9%	49.3%	8.7%	54.3%
CV	71.8%	41.1%	53.1%	42.9%	108.3%	29.6%	61.6%	51.1%	36.1%	69.1%	33.3%	34.2%	45.7%	24.7%	52.6%	41.0%	44.7%	29.0%	58.7%
RANKING	13	2	8	15	5	1	11	6	15	4	8	10	6	15	18	3	12	13	

ANE GSA06: Western Mediterranean (in green GSA06 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	46.7%	68.3%	60.0%	86.7%	43.3%	80.0%	36.7%	73.7%	38.8%	88.3%	61.7%	65.0%	85.0%	51.7%	16.7%	81.7%	41.7%	6.7%	57.5%
CV	83.2%	42.9%	37.5%	30.3%	87.0%	27.4%	98.9%	32.8%	34.3%	20.2%	34.0%	34.5%	21.7%	50.8%	29.9%	25.5%	30.9%	24.1%	49.9%
RANKING	14	12	10	3	17	4	18	6	16	1	11	9	2	8	14	5	6	13	

Table 4.3. Cont.

Modal age of Expert Readers

Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19

ANE GSA07: Gulf of Lion (in green GSA07 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	63.2%	92.1%	81.6%	86.8%	71.1%	92.1%	76.3%	71.1%	39.5%	89.2%	60.5%	73.7%	78.9%	78.4%	78.9%	68.4%	63.2%	40.5%	72.5%
CV	31.4%	10.9%	29.8%	24.2%	19.2%	19.2%	27.2%	30.5%	39.7%	21.6%	30.3%	28.1%	17.0%	28.5%	26.2%	35.9%	43.0%	26.6%	31.3%
RANKING	18	1	8	3	9	2	9	12	14	5	17	11	6	7	3	15	12	16	

ANE GSA10: Southern Thyrrenian

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	57.4%	49.1%	60.0%	83.3%	67.3%	65.5%	43.6%	80.0%	45.5%	63.6%	63.6%	69.1%	72.7%	50.9%	32.7%	76.4%	51.9%	14.5%	58.2%
CV	57.4%	26.5%	55.1%	82.6%	60.5%	48.4%	108.5%	116.7%	42.0%	48.5%	54.0%	65.9%	48.7%	46.8%	32.6%	60.7%	64.7%	29.8%	67.2%
RANKING	14	11	9	4	12	4	18	4	13	9	7	8	3	1	15	1	17	16	

ANE GSA16: Strait of Sicily (in green GSA16 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	58.7%	75.4%	48.5%	63.6%	74.2%	60.6%	66.7%	54.7%	36.4%	63.6%	68.2%	66.7%	66.7%	50.0%	27.3%	81.8%	34.8%	12.1%	56.1%
CV	66.0%	74.4%	48.1%	53.6%	39.3%	57.1%	37.3%	63.1%	57.1%	53.0%	47.4%	50.4%	57.9%	51.9%	52.8%	50.1%	52.2%	39.2%	78.7%
RANKING	14	7	8	8	3	11	5	16	18	10	2	4	12	6	17	1	14	13	

ANE GSA19: Western Ionian (in green GSA19 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	55.6%	51.9%	43.6%	65.5%	72.7%	50.9%	52.7%	88.5%	56.4%	43.6%	69.1%	58.2%	67.3%	34.5%	30.9%	65.5%	61.8%	27.3%	55.2%
CV	158.9%	19.9%	64.8%	69.3%	28.1%	36.6%	77.1%	121.4%	57.4%	39.9%	41.8%	48.2%	52.2%	61.7%	36.7%	56.3%	70.1%	38.7%	60.9%
RANKING	15	7	9	9	1	8	9	5	14	16	4	6	2	9	17	2	13	18	

ANE GSA22: Aegean Sea (in green GSA22 assessment readers)

MODAL experts	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	ALL
% agr.	90.0%	54.3%	92.9%	65.7%	97.1%	51.4%	94.3%	100.0%	57.1%	52.9%	77.1%	67.1%	65.7%	98.6%	48.6%	60.0%	60.0%	25.7%	69.8%
CV	30.1%	33.1%	27.2%	69.7%	16.9%	32.9%	11.5%	0.0%	86.8%	32.9%	51.8%	67.4%	72.0%	4.1%	32.3%	79.2%	72.4%	75.0%	55.7%
RANKING	6	12	5	9	3	14	4	1	18	12	7	8	11	2	16	14	9	16	

Taking the results of the current exchange into account a workshop is recommended to be carried out in 2015, dealing with the generic terms of references (ICES, 2014a) for workshops on age calibration in order to increase the agreement and accuracy of age readings of the laboratories involved in stock assessment of these pelagic species. Furthermore, work on growth and validations studies need to be integrated in the workshop. Following a WKSABCAL (ICES, 2014c) recommendation it should be also considered to report (and preferable quantify) the impact of the workshop results on the stock-assessment based on collated age data (e.g. error around SSB estimates; furthermore Age Reading Error Matrices (ICES, 2014c) could be the right output to be provided by age calibration workshops to stock assessment working groups.

Looking to the future preparation of the workshop in 2016, it is suggested that validation studies could be made and submitted to this workshop, especially studies of progression of length frequency modes throughout time, as is one of the most basic analyses which can provide reliable information on growth, particularly of young, fast-growing fish. Further, this method is low cost and takes advantage of data routinely obtained in fishery studies (length). Other studies such as on counting of daily growth marks in otoliths or others would be also welcome.

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ANNEX 1. AGE READING RESULTS BY AREA

ANE_VII- English Channel

Table 1 **Anchovy Otolith SET VII-English Channel (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-5		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreement	Precision CV
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0051.jpg	-	95.0	M	10	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	1	0	89%	291%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0062.jpg	-	100.0	F	10	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	1	0	89%	291%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0045.jpg	-	105.0	F	10	0	0	0	0	0	0	-	0	0	1	0	1	0	0	0	0	0	0	1	0	83%	230%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0041.jpg	-	110.0	M	10	0	0	0	0	0	0	-	0	0	1	0	1	0	0	0	1	0	0	2	0	78%	207%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0094.jpg	-	115.0	F	10	0	0	0	1	0	1	-	0	0	1	1	1	0	1	0	1	1	2	2	0	44%	103%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0063.jpg	-	120.0	F	10	0	0	0	0	0	0	-	0	0	1	0	1	0	0	0	0	0	0	2	0	83%	247%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0086.jpg	-	125.0	F	10	0	0	0	0	0	0	-	0	0	1	0	1	0	0	0	0	0	0	2	0	83%	247%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0091.jpg	-	130.0	F	10	0	0	0	0	0	0	-	0	0	1	0	1	1	0	0	0	0	1	2	0	72%	178%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0082.jpg	-	135.0	F	10	0	0	0	0	0	0	-	0	0	1	0	1	1	0	0	0	0	1	2	0	72%	178%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0066.jpg	-	145.0	F	10	0	0	0	1	0	0	-	0	0	1	0	1	1	0	0	0	1	0	3	0	67%	176%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0014.jpg	-	155.0	M	9	1	2	2	2	2	2	-	2	1	3	2	2	1	2	2	3	2	3	3	2	61%	31%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0011.jpg	-	160.0	M	9	1	1	1	2	1	1	-	1	1	2	1	2	1	1	2	2	1	2	3	1	61%	43%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0005.jpg	-	165.0	M	9	1	1	1	2	1	1	-	1	1	2	1	2	2	2	3	2	2	2	3	1	44%	41%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0001.jpg	-	170.0	M	9	2	2	1	2	2	2	-	2	1	2	2	2	2	2	2	2	2	2	4	2	83%	30%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0008.jpg	-	175.0	F	9	1	1	1	1	1	1	-	1	1	2	1	2	2	1	2	1	1	4	4	1	67%	63%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0029.jpg	-	180.0	F	9	1	1	1	3	2	2	-	1	1	3	2	2	2	2	3	3	2	3	4	2	39%	43%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0037.jpg	-	185.0	M	9	1	3	1	2	2	3	-	2	1	3	3	3	3	2	3	3	2	2	4	3	44%	36%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0038.jpg	-	190.0	M	9	1	2	1	3	2	2	-	1	2	3	2	2	2	2	-	2	2	3	4	2	59%	37%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0035.jpg	-	195.0	M	9	2	2	1	2	2	2	-	2	2	4	2	2	3	2	4	2	2	4	5	2	67%	42%
Sem 2	2014	JC_14_TRIM3_CAMANOC_O_0036.jpg	-	200.0	F	9	2	2	1	3	2	2	-	2	-	3	2	3	3	2	4	4	2	4	5	2	47%	39%
					Total read		20	20	20	20	20	20	0	20	19	20	20	20	20	20	19	20	20	20	20		**66.7%**	**127.6%**
					Total NOT read		0	0	0	0	0	0	20	0	1	0	0	0	0	0	1	0	0	0	0			

ANE_VIII- Bay of Biscay

Table 1 **Anchovy Otolith SET VIII-Bay of Biscay (Anchovy Exchange 2014)**

Stratum	year	Sample no	Fish no	Fish length	Sex	Landing month	Sp AU Reader 1	Sp IR Reader 2	Fr PG Reader 3	It SG Reader 4	Sp PT Reader 5	Sp CD Reader 6	Sp CN Reader 7	Sp JT Reader 8	It PC Reader 9	It LC Reader 10	Sp AA Reader 11	It SM Reader 12	It MP Reader 13	Gr CM Reader 14	Fr EB Reader 15	Po ES Reader 16	Gr DP Reader 17	Sl TM Reader 18	It PG Reader 19	RANGE r. 1-15 MODAL age	Percent agreement	Precision CV
Sem 1	2013	ANE06032013_91_01.jpg	-	104.0	female	3	1	1	1	0	0	1	-	1	0	0	1	0	0	0	-	0	0	0	1	0	59%	123%
Sem 1	2013	ANE06032013_78_02.jpg	-	114.0	male	3	2	2	2	1	1	1	-	0	2	1	1	1	1	1	-	0	1	1	2	1	59%	54%
Sem 1	2013	ANE19062013_93_03.jpg	-	125.0	male	6	1	2	1	1	1	-	-	1	1	1	1	1	0	1	1	1	1	2	2	1	76%	43%
Sem 1	2013	ANE19062013_94_04.jpg	-	135.0	male	6	2	2	1	2	1	2	-	1	2	1	2	1	1	1	2	1	1	2	2	2	50%	34%
Sem 1	2013	ANE22032013_80_05.jpg	-	155.0	female	3	1	2	1	1	1	1	-	1	2	2	1	1	1	1	-	1	1	3	2	1	71%	45%
Sem 1	2013	ANE22032013_99_06.jpg	-	142.0	male	3	1	1	1	1	1	2	-	1	2	1	1	0	0	1	-	1	1	2	3	1	65%	62%
Sem 1	2013	ANE22032013_49_07.jpg	-	157.0	female	3	1	2	1	2	1	2	-	1	2	2	1	1	1	1	-	1	1	2	2	1	59%	36%
Sem 1	2013	ANE19062013_33_08.jpg	-	150.0	female	6	1	1	1	1	1	1	-	1	1	2	1	1	1	1	-	1	1	1	2	1	88%	30%
Sem 1	2013	ANE22032013_36_09.jpg	-	149.0	male	3	1	1	1	2	1	1	-	1	2	1	1	1	1	1	-	1	1	2	2	1	76%	35%
Sem 1	2013	ANE06032013_114_10.jpg	-	170.0	female	3	3	2	2	2	2	2	-	1	2	3	2	2	2	2	3	2	2	3	3	2	67%	25%
Sem 2	2011	ANE01112011_114_8_11.jpg	-	96.0	undefined	11	0	0	0	0	0	-	-	0	0	0	0	0	0	0	-	0	0	0	0	0	100%	0%
Sem 2	2011	ANE01112011_114_5_12.jpg	-	114.0	undefined	11	0	0	0	0	0	0	-	0	0	1	0	0	0	0	-	0	0	0	1	0	88%	282%
Sem 2	2013	ANE03122013_119_13.jpg	-	127.0	female	12	1	1	1	0	1	1	-	1	1	1	1	1	1	1	-	1	2	1	2	1	82%	40%
Sem 2	2013	ANE20092013_15_14.jpg	-	129.0	female	9	1	2	1	1	1	1	-	1	2	1	1	1	1	1	1	1	1	2	3	1	78%	45%
Sem 2	2013	ANE06082013_40_15.jpg	-	137.0	male	8	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	3	1	94%	42%
Sem 2	2013	ANE06082013_20_16.jpg	-	146.0	male	8	3	2	2	2	2	1	-	1	3	2	2	1	1	2	2	2	2	2	3	2	61%	33%
Sem 2	2013	ANE06082013_19_17.jpg	-	155.0	male	8	3	3	2	3	3	3	-	2	2	3	3	1	1	3	2	2	3	3	3	3	61%	28%
Sem 2	2012	ANE07102012_65_20_18.jpg	-	166.0	male	10	2	2	1	2	2	1	-	1	2	2	1	2	2	2	-	2	2	1	4	2	65%	40%
Sem 2	2011	ANE01112011_115_8_19.jpg	-	175.0	female	11	2	2	2	2	2	2	-	2	2	2	2	2	1	2	2	2	2	2	3	2	89%	17%
Sem 2	2011	ANE01112011_115_21_20.jpg	-	183.0	male	11	2	1	1	2	2	1	-	1	2	2	1	1	2	2	-	1	2	2	4	2	53%	45%
Sem 1	2013	r5020a2.jpg	-	135.0	male	3	1	1	1	1	1	1	-	1	-	1	1	1	2	1	1	1	1	1	2	1	88%	30%
Sem 1	2013	r5020a4.jpg	-	135.0	male	3	1	1	1	1	1	1	-	1	-	1	1	1	1	1	1	1	1	1	2	1	94%	23%
Sem 1	2013	r5020b5.jpg	-	150.0	male	3	3	3	2	2	3	3	-	2	3	2	3	2	2	2	3	2	2	2	3	2	56%	21%
Sem 1	2013	r5020b8.jpg	-	150.0	female	3	1	1	1	2	2	2	-	2	3	2	2	2	2	2	1	2	2	3	2	2	67%	31%
Sem 1	2013	r5020b9.jpg	-	155.0	male	3	3	3	3	2	2	3	-	3	3	3	3	2	2	3	3	2	2	2	3	3	61%	19%
Sem 1	2013	r5020c1.jpg	-	155.0	female	3	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	3	3	2	89%	15%
Sem 1	2013	r5020c2.jpg	-	155.0	male	3	3	3	3	3	3	3	-	3	3	2	3	2	2	2	3	3	2	2	3	3	67%	18%
Sem 1	2013	r5020c9.jpg	-	165.0	female	3	3	2	2	3	2	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	83%	18%
Sem 1	2013	r5020d4.jpg	-	170.0	female	3	3	3	2	3	3	3	-	3	3	3	3	2	2	3	3	2	3	3	4	3	72%	18%
Sem 1	2013	r5020d5.jpg	-	170.0	female	3	2	2	2	3	2	2	-	2	2	2	2	1	1	2	2	2	2	3	3	2	72%	26%
Sem 1	2013	ANE-230413-1_02.jpg	-	149.0	male	4	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	94%	11%
Sem 1	2013	ANE-230413-1_03.jpg	-	150.0	male	4	2	2	2	2	2	2	-	2	2	2	2	2	1	2	2	2	2	3	-	2	88%	18%
Sem 1	2013	ANE-230413-1_07.jpg	-	149.0	male	4	1	1	1	1	1	1	-	1	1	2	1	2	2	1	2	1	2	2	3	1	61%	43%
Sem 1	2013	ANE-230413-1_09.jpg	-	156.0	male	4	3	3	3	3	2	3	-	2	3	2	3	2	2	2	3	3	2	3	3	3	61%	19%
Sem 1	2013	ANE-230413-1_10.jpg	-	146.0	male	4	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	3	2	2	3	2	89%	15%
Sem 1	2013	ANE-230413-1_11.jpg	-	152.0	male	4	1	1	1	1	1	1	-	1	1	2	1	2	2	2	2	3	1	3	3	1	56%	48%
Sem 1	2013	ANE-230413-1_12.jpg	-	174.0	female	4	2	2	2	2	2	2	-	2	2	4	2	2	2	2	3	2	4	4	2	2	78%	33%
Sem 1	2013	ANE-230413-1_13.jpg	-	156.0	female	4	1	1	1	1	1	1	-	1	1	2	1	2	2	1	2	3	2	3	3	1	56%	48%
Sem 1	2013	ANE-230413-1_14.jpg	-	160.0	female	4	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	94%	11%
Sem 1	2013	ANE-230413-1_15.jpg	-	150.0	female	4	1	1	1	1	1	1	-	1	1	2	1	2	1	1	1	1	1	2	3	1	78%	45%
Sem 1	2013	ANE-230413-1_36.jpg	-	159.0	female	4	2	3	3	3	3	3	-	3	3	2	3	2	2	2	3	3	2	3	2	3	61%	19%
Sem 1	2013	ANE-230413-1_39.jpg	-	164.0	female	4	3	3	3	3	3	3	-	2	3	3	3	2	2	2	3	3	2	3	3	3	72%	17%
Sem 1	2013	ANE-230413-1_43.jpg	-	154.0	female	4	1	1	1	2	1	1	-	1	1	3	1	1	2	1	1	2	1	3	3	1	67%	52%
Sem 1	2013	ANE-230413-1_44.jpg	-	164.0	female	4	3	3	3	2	3	3	-	3	3	2	3	2	2	2	3	3	2	2	3	3	61%	19%
Sem 1	2013	ANE-230413-1_47.jpg	-	160.0	female	4	3	3	3	3	3	3	-	3	3	3	3	2	2	2	3	3	3	3	3	3	83%	14%
Sem 2	2010	JUV10-9024_17.jpg	-	91.0	undefined	9	0	0	0	0	0	0	-	0	0	1	0	0	0	0	0	0	0	0	1	0	89%	291%
Sem 2	2010	JUV10-9024_19.jpg	-	90.0	undefined	9	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	1	0	94%	424%
Sem 2	2010	JUV10-9024_20.jpg	-	84.0	undefined	9	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	100%	0%
Sem 2	2013	ANE-260913-1_01.jpg	-	158.0	undefined	9	1	1	1	1	1	1	-	1	1	3	1	2	3	1	1	2	1	3	4	1	67%	61%
Sem 2	2013	ANE-260913-1_03.jpg	-	148.0	undefined	9	1	1	1	1	1	1	-	1	1	2	1	1	2	1	1	1	1	1	3	1	83%	45%
Sem 2	2013	ANE-260913-1_04.jpg	-	165.0	male	9	2	2	2	2	2	2	-	1	3	2	2	2	2	2	2	2	2	2	3	2	83%	20%
Sem 2	2013	ANE-260913-1_05.jpg	-	165.0	undefined	9	1	1	1	2	1	1	-	1	2	3	1	2	2	1	1	1	2	1	4	1	61%	55%
Sem 2	2013	ANE-260913-1_06.jpg	-	155.0	undefined	9	1	1	2	2	1	1	-	1	2	2	1	2	2	1	1	1	1	2	3	1	56%	41%
Sem 2	2013	ANE-260913-1_07.jpg	-	153.0	undefined	9	1	1	2	2	1	1	-	1	2	2	1	2	2	1	1	1	2	2	3	1	50%	40%
Sem 2	2013	ANE-260913-1_08.jpg	-	156.0	male	9	2	2	2	2	2	2	-	1	2	2	2	2	2	2	2	2	2	1	3	2	83%	21%
Sem 2	2013	ANE-260913-1_12.jpg	-	156.0	female	9	2	2	2	2	2	1	-	1	3	2	2	2	2	2	2	2	2	2	3	2	78%	24%
Sem 2	2013	ANE-260913-1_15.jpg	-	158.0	female	9	1	1	1	1	1	1	-	1	1	2	1	1	1	1	1	1	1	1	3	1	89%	44%
Sem 2	2013	ANE-260913-1_16.jpg	-	154.0	female	9	1	1	1	1	1	1	-	1	2	2	1	2	2	1	1	1	1	2	3	1	67%	44%
Sem 2	2013	ANE-260913-1_17.jpg	-	163.0	undefined	9	3	3	2	2	2	2	-	1	3	3	2	2	2	2	2	2	2	2	3	2	67%	25%
Sem 2	2013	ANE-260913-1_18.jpg	-	151.0	male	9	1	1	1	1	1	1	-	1	1	2	1	1	1	1	1	1	1	1	3	1	89%	44%
Sem 2	2013	ANE-260913-1_19.jpg	-	160.0	undefined	9	1	2	1	2	1	1	-	1	2	2	1	1	1	1	1	1	1	1	3	1	72%	45%
Sem 2	2013	ANE-260913-1_20.jpg	-	171.0	female	9	2	2	2	2	2	2	-	2	2	3	2	2	2	2	2	2	2	2	4	2	89%	24%
Sem 2	2013	ANE-260913-1_28.jpg	-	161.0	female	9	3	3	3	2	3	3	-	2	3	3	3	2	2	3	3	3	3	3	4	3	72%	18%
Sem 2	2013	ANE-260913-1_32.jpg	-	158.0	undefined	9	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	94%	11%
Sem 2	2013	ANE-260913-1_34.jpg	-	170.0	undefined	9	2	2	2	2	2	2	-	2	2	3	2	2	2	2	2	2	2	2	4	2	89%	24%
Sem 2	2013	ANE-260913-1_35.jpg	-	153.0	undefined	9	1	1	1	2	1	1	-	1	3	2	1	2	2	1	2	2	1	3	3	1	50%	46%
Sem 2	2013	ANE-260913-1_37.jpg	-	155.0	female	9	1	1	1	1	1	1	-	1	2	2	1	2	1	1	1	2	1	2	4	1	67%	54%
Sem 2	2013	ANE-260913-1_38.jpg	-	158.0	undefined	9	3	3	2	2	2	3	-	1	3	2	3	2	2	3	2	3	3	2	4	3	44%	28%
Sem 2	2013	ANE-260913-1_39.jpg	-	172.0	male	9	2	2	2	2	2	2	-	2	2	2	2	3	2	2	2	2	2	2	4	2	89%	24%
Sem 2	2013	ANE-260913-1_40.jpg	-	158.0	male	9	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	3	2	94%	11%
					Total read		70	70	70	70	70	68	0	70	68	70	70	70	70	70	58	70	70	70	69		**74.4%**	**45.1%**
					Total NOT read		0	0	0	0	0	2	70	0	2	0	0	0	0	0	12	0	0	0	1			

ANE_IXa- Gulf of Cadiz & Portugal Coast

Table 1 **Anchovy Otolith SET IXa- Gulf of Cadiz & Portugal Coast (Anchovy Exchange 2014)**

RANGE r. 1-15

Sample			Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	MODAL	Percent	Precision
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	age	agreement	CV
Sem 1	2013	IPMA_ANEIXaCN_1A.jpg	-	110.0	male	4	1	1	1	0	1	1	-	1	2	1	1	0	1	1	1	1	1	1	2	1	78%	49%
Sem 1	2013	IPMA_ANEIXaCN_2A.jpg	-	110.0	male	4	0	1	1	0	1	1	-	1	1	1	1	0	0	0	0	1	1	0	1	1	61%	82%
Sem 1	2013	IPMA_ANEIXaCN_3A.jpg	-	120.0	female	4	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	2	1	94%	22%
Sem 1	2013	IPMA_ANEIXaCN_4A.jpg	-	125.0	male	5	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	2	2	1	89%	29%
Sem 1	2013	IPMA_ANEIXaCN_5A.jpg	-	135.0	male	5	1	1	1	1	1	1	-	1	1	1	1	2	1	1	1	2	1	1	2	1	83%	33%
Sem 1	2013	IPMA_ANEIXaCN_6A.jpg	-	140.0	male	5	2	2	2	2	2	2	-	1	2	1	2	2	2	2	2	2	2	3	2	2	83%	21%
Sem 1	2013	IPMA_ANEIXaCN_7A.jpg	-	145.0	female	5	1	1	1	2	1	2	-	1	2	2	2	2	2	1	2	2	1	2	3	2	56%	36%
Sem 1	2013	IPMA_ANEIXaCN_8A.jpg	-	150.0	female	5	2	2	2	2	2	2	-	2	2	2	2	2	2	2	3	2	2	2	3	2	89%	15%
Sem 1	2013	IPMA_ANEIXaCN_9A.jpg	-	150.0	female	5	2	2	2	2	2	2	-	1	2	2	2	2	2	2	3	2	2	3	2	2	83%	20%
Sem 1	2013	IPMA_ANEIXaCN_10A.jpg	-	155.0	female	5	1	1	1	1	1	1	-	1	1	2	1	2	2	1	2	2	1	3	3	1	61%	47%
Sem 2	2011	IPMA_ANEIXaCN_1B.jpg	-	145.0	male	8	1	1	1	1	1	0	-	1	1	1	0	1	1	1	2	1	1	1	3	1	78%	61%
Sem 2	2011	IPMA_ANEIXaCN_2B.jpg	-	155.0	male	8	1	1	2	2	2	2	-	1	2	2	2	2	2	2	2	3	2	3	3	2	67%	30%
Sem 2	2011	IPMA_ANEIXaCN_3B.jpg	-	155.0	male	8	1	1	1	1	1	1	-	1	1	2	1	2	2	1	1	2	1	1	2	1	72%	36%
Sem 2	2011	IPMA_ANEIXaCN_4B.jpg	-	160.0	undefined	8	1	1	1	2	2	2	-	1	1	3	2	2	2	2	-	2	1	1	4	2	47%	47%
Sem 2	2011	IPMA_ANEIXaCN_5B.jpg	-	155.0	female	9	1	1	1	1	2	2	-	1	2	2	2	1	2	2	2	2	1	2	4	2	56%	44%
Sem 2	2011	IPMA_ANEIXaCN_6B.jpg	-	155.0	male	9	1	1	1	1	1	1	-	1	0	2	1	1	2	1	2	2	1	1	3	1	67%	52%
Sem 2	2011	IPMA_ANEIXaCN_7B.jpg	-	160.0	female	9	1	1	1	1	1	1	-	1	1	3	1	2	2	1	-	1	1	2	4	1	71%	59%
Sem 2	2011	IPMA_ANEIXaCN_8B.jpg	-	165.0	undefined	9	1	1	1	2	1	1	-	1	3	2	1	2	2	2	3	1	2	2	3	1	44%	44%
Sem 2	2011	IPMA_ANEIXaCN_9B.jpg	-	150.0	male	9	0	1	1	1	1	0	-	1	2	2	0	1	1	1	2	0	1	2	3	1	50%	75%
Sem 2	2011	IPMA_ANEIXaCN_10B.jpg	-	155.0	male	9	1	1	1	1	1	1	-	1	1	2	1	2	2	1	2	1	1	2	3	1	67%	44%
Sem 1	2013	OE2014_IXAS_01.jpg	-	101.0	male	3	1	1	1	0	1	2	-	1	1	0	2	1	1	1	1	2	1	2	1	1	67%	52%
Sem 1	2013	OE2014_IXAS_02.jpg	-	107.0	female	3	1	1	2	1	1	2	-	1	1	1	2	1	0	1	1	2	1	1	1	1	72%	44%
Sem 1	2013	OE2014_IXAS_03.jpg	-	122.0	female	3	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	2	1	94%	22%
Sem 1	2013	OE2014_IXAS_04.jpg	-	119.0	female	3	1	1	1	1	1	1	-	1	1	1	1	1	-	1	1	2	1	2	2	1	82%	33%
Sem 1	2013	OE2014_IXAS_05.jpg	-	108.0	male	3	1	1	1	1	1	1	-	1	1	0	1	1	1	1	1	1	1	2	2	1	83%	39%
Sem 1	2013	OE2014_IXAS_06.jpg	-	95.0	male	3	1	1	1	1	1	1	-	1	1	0	1	0	0	1	1	1	1	0	0	1	72%	64%
Sem 1	2013	OE2014_IXAS_07.jpg	-	110.0	male	3	1	1	2	1	1	1	-	1	1	1	1	1	1	1	1	1	1	2	1	1	89%	29%
Sem 1	2013	OE2014_IXAS_08.jpg	-	117.0	female	3	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	2	1	94%	22%
Sem 1	2013	OE2014_IXAS_09.jpg	-	103.0	male	3	1	1	2	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	1	1	72%	36%
Sem 1	2013	OE2014_IXAS_10.jpg	-	124.0	male	4	1	1	1	1	1	1	-	1	1	1	2	1	1	1	1	2	1	2	2	1	78%	35%
Sem 1	2013	OE2014_IXAS_11.jpg	-	160.0	female	4	2	2	1	2	2	2	-	2	2	3	2	2	2	2	3	2	2	3	3	2	72%	24%
Sem 1	2013	OE2014_IXAS_12.jpg	-	126.0	male	4	1	1	1	1	1	2	-	1	2	1	2	1	1	1	2	2	1	2	2	1	61%	36%
Sem 1	2013	OE2014_IXAS_13.jpg	-	133.0	male	4	1	1	2	1	1	1	-	1	1	1	2	2	2	1	2	2	1	2	2	1	56%	35%
Sem 1	2013	OE2014_IXAS_14.jpg	-	118.0	male	4	1	1	1	1	1	1	-	1	2	1	1	1	1	1	1	1	1	2	1	1	89%	29%
Sem 1	2013	OE2014_IXAS_15.jpg	-	122.0	male	4	1	1	2	1	1	2	-	1	1	1	2	1	1	1	2	2	1	2	2	1	61%	36%
Sem 1	2013	OE2014_IXAS_16.jpg	-	136.0	male	4	1	1	1	1	1	1	-	1	1	1	1	2	2	1	2	1	1	2	2	1	72%	36%
Sem 1	2013	OE2014_IXAS_17.jpg	-	118.0	female	4	1	1	2	1	1	1	-	1	3	1	2	1	1	1	2	1	1	2	1	1	72%	45%
Sem 1	2013	OE2014_IXAS_18.jpg	-	127.0	female	4	1	1	2	1	1	1	-	1	3	1	2	1	1	1	2	2	1	2	2	1	61%	43%
Sem 1	2013	OE2014_IXAS_19.jpg	-	137.0	male	5	1	1	1	1	1	2	-	1	3	2	2	2	2	1	2	3	2	3	2	2	44%	41%
Sem 1	2013	OE2014_IXAS_20.jpg	-	127.0	female	5	1	1	1	1	1	1	-	1	3	1	2	1	1	1	2	2	2	2	2	1	61%	43%
Sem 1	2013	OE2014_IXAS_21.jpg	-	113.0	female	5	1	1	2	1	1	2	-	1	3	1	2	1	1	1	-	2	1	1	2	1	65%	44%
Sem 1	2013	OE2014_IXAS_22.jpg	-	128.0	male	5	1	1	1	1	1	1	-	1	2	2	2	1	1	2	-	2	1	3	3	1	59%	47%
Sem 1	2013	OE2014_IXAS_23.jpg	-	122.0	female	5	1	1	2	1	1	2	-	1	1	1	2	1	1	1	2	2	1	1	2	1	67%	36%
Sem 1	2013	OE2014_IXAS_24.jpg	-	131.0	female	5	1	1	1	1	1	2	-	1	2	1	2	1	1	1	3	2	1	2	2	1	61%	43%
Sem 1	2013	OE2014_IXAS_25.jpg	-	119.0	male	5	2	1	1	1	1	1	-	1	1	1	1	1	1	1	2	1	1	1	2	1	83%	33%
Sem 1	2013	OE2014_IXAS_26.jpg	-	117.0	male	5	1	1	1	1	1	2	-	1	1	1	2	1	1	1	2	2	1	1	1	1	78%	35%
Sem 1	2013	OE2014_IXAS_27.jpg	-	113.0	male	5	1	2	1	1	1	2	-	1	2	1	2	1	1	1	2	2	1	2	1	1	61%	36%
Sem 1	2013	OE2014_IXAS_28.jpg	-	161.0	male	6	2	2	2	2	2	2	-	2	2	3	2	1	2	2	3	2	2	3	3	2	72%	24%
Sem 1	2013	OE2014_IXAS_29.jpg	-	114.0	male	6	1	1	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	72%	36%
Sem 1	2013	OE2014_IXAS_30.jpg	-	123.0	male	6	1	1	1	2	1	2	-	1	2	1	2	2	2	1	1	2	1	2	2	1	50%	34%
Sem 1	2013	OE2014_IXAS_31.jpg	-	132.0	male	6	1	1	1	1	1	2	-	1	2	2	2	1	1	1	-	2	1	2	2	1	59%	36%
Sem 1	2013	OE2014_IXAS_32.jpg	-	156.0	female	6	1	2	3	2	2	2	-	2	2	3	2	2	2	2	3	2	2	2	2	2	78%	22%
Sem 1	2013	OE2014_IXAS_33.jpg	-	134.0	male	6	1	1	1	1	1	2	-	1	2	2	2	1	1	1	2	2	1	2	2	1	56%	35%
Sem 1	2013	OE2014_IXAS_34.jpg	-	123.0	male	6	1	1	2	1	1	2	-	1	-	1	2	1	1	1	1	2	1	2	2	1	65%	36%
Sem 1	2013	OE2014_IXAS_35.jpg	-	121.0	male	6	1	1	1	1	1	2	-	1	2	1	2	1	1	1	2	2	1	2	2	1	61%	36%
Sem 1	2013	OE2014_IXAS_36.jpg	-	124.0	male	6	1	1	1	1	1	2	-	1	2	1	2	1	1	1	2	2	1	1	2	1	67%	36%
Sem 2	2013	OE2014_IXAS_37.jpg	-	133.0	female	7	1	1	2	2	1	2	-	1	2	2	2	2	1	2	2	2	1	3	3	2	56%	36%
Sem 2	2013	OE2014_IXAS_38.jpg	-	160.0	male	7	2	2	2	2	2	3	-	2	3	3	2	2	2	2	3	2	2	2	4	2	72%	25%
Sem 2	2013	OE2014_IXAS_39.jpg	-	126.0	male	7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	2	3	1	89%	44%
Sem 2	2013	OE2014_IXAS_40.jpg	-	130.0	male	7	1	1	1	1	1	1	-	1	3	2	1	2	2	2	1	2	1	2	3	1	56%	45%
Sem 2	2013	OE2014_IXAS_41.jpg	-	137.0	female	7	1	1	1	2	1	1	-	1	2	2	1	2	2	1	2	2	1	2	3	1	50%	40%
Sem 2	2013	OE2014_IXAS_42.jpg	-	130.0	male	7	1	1	1	1	1	1	-	1	2	2	1	2	1	1	-	2	1	2	3	1	65%	44%
Sem 2	2013	OE2014_IXAS_43.jpg	-	120.0	male	7	1	1	1	0	1	1	-	1	2	1	1	1	1	1	-	3	1	1	3	1	76%	61%
Sem 2	2013	OE2014_IXAS_44.jpg	-	132.0	female	7	1	1	2	2	1	1	-	1	2	2	1	1	1	1	2	2	1	2	3	1	56%	41%
Sem 2	2013	OE2014_IXAS_45.jpg	-	129.0	female	7	1	2	3	1	1	1	-	1	3	1	1	2	2	2	2	3	1	3	3	1	44%	47%
Sem 2	2013	OE2014_IXAS_46.jpg	-	160.0	female	8	2	2	1	2	2	2	-	1	2	3	1	2	2	2	3	3	2	3	4	2	56%	36%
Sem 2	2013	OE2014_IXAS_47.jpg	-	149.0	female	8	1	1	1	1	1	1	-	1	1	2	1	1	2	1	2	3	1	2	3	1	67%	49%
Sem 2	2013	OE2014_IXAS_48.jpg	-	145.0	female	8	3	1	2	2	2	1	-	2	2	2	2	2	2	2	2	4	2	2	3	2	72%	32%
Sem 2	2013	OE2014_IXAS_49.jpg	-	153.0	female	8	1	1	1	2	2	1	-	1	2	2	1	2	2	2	2	2	2	2	3	2	61%	33%
Sem 2	2013	OE2014_IXAS_50.jpg	-	154.0	male	8	1	1	1	2	2	1	-	1	3	3	1	2	2	2	2	3	2	2	4	2	44%	45%
Sem 2	2013	OE2014_IXAS_51.jpg	-	148	female	8	1	1	2	2	2	1	-	1	2	3	1	2	2	2	2	3	2	2	3	2	56%	36%
Sem 2	2013	OE2014_IXAS_52.jpg	-	144	female	8	1	1	2	2	2	1	-	1	2	2	2	2	2	2	2	3	2	3	3	2	61%	33%
Sem 2	2013	OE2014_IXAS_53.jpg	-	138	female	8	1	1	1	1	1	1	-	1	1	1	1	1	1	1	2	3	1	2	3	1	78%	51%
Sem 2	2013	OE2014_IXAS_54.jpg	-	137	male	8	1	1	1	1	1	1	-	1	1	1	1	2	2	1	-	1	1	2	3	1	76%	45%
Sem 2	2013	OE2014_IXAS_55.jpg	-	164	male	9	2	2	2	2	2	2	-	2	3	3	2	2	2	2	3	1	2	2	4	2	72%	29%
Sem 2	2013	OE2014_IXAS_56.jpg	-	140	female	9	1	1	1	1	1	1	-	1	1	2	1	2	1	1	2	1	1	1	3	1	78%	45%
Sem 2	2013	OE2014_IXAS_57.jpg	-	141	male	9	1	1	3	2	1	1	-	1	1	2	1	2	2	1	2	3	1	3	3	1	50%	48%
Sem 2	2013	OE2014_IXAS_58.jpg	-	125	male	9	1	1	2	0	1	1	-	1	1	1	1	2	2	1	-	2	1	2	2	1	59%	45%
Sem 2	2013	OE2014_IXAS_59.jpg	-	127	female	9	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	3	1	94%	42%
Sem 2	2013	OE2014_IXAS_60.jpg	-	134	male	9	1	1	1	1	1	1	-	1	1	1	1	2	1	1	2	2	1	2	3	1	72%	45%
Sem 2	2013	OE2014_IXAS_61.jpg	-	106	female	9	0	0	0	0	0	0	-	0	0	1	0	1	1	0	0	0	0	0	2	0	78%	207%
Sem 2	2013	OE2014_IXAS_62.jpg	-	145	female	9	1	1	1	1	1	1	-	1	2	2	1	2	2	1	2	0	1	2	3	1	56%	50%
Sem 2	2013	OE2014_IXAS_63.jpg	-	138	female	9	1	1	2	1	1	1	-	1	3	2	1	1	2	2	2	2	2	2	3	1	44%	41%
Sem 2	2013	OE2014_IXAS_64.jpg	-	128	female	11	1	1	2	1	1	1	-	1	3	1	1	1	1	1	-	2	1	2	3	1	71%	50%
Sem 2	2013	OE2014_IXAS_65.jpg	-	161	female	11	2	2	2	2	2	2	-	2	3	3	2	3	3	2	3	3	2	3	4	2	56%	25%
Sem 2	2013	OE2014_IXAS_66.jpg	-	155	male	11	2	2	1	1	2	0	-	2	2	3	1	2	2	2	-	2	1	2	3	2	59%	43%
Sem 2	2013	OE2014_IXAS_67.jpg	-	107	female	11	0	0	0	0	0	0	-	0	0	1	0	1	0	0	0	0	0	0	1	0	83%	230%
Sem 2	2013	OE2014_IXAS_68.jpg	-	102	female	11	0	0	0	0	0	0	-	0	0	0	0	1	0	0	0	0	0	0	1	0	89%	291%
Sem 2	2013	OE2014_IXAS_69.jpg	-	107	female	11	1	0	2	0	0	1	-	0	3	1	1	1	1	1	1	1	1	1	2	1	61%	77%
Sem 2	2013	OE2014_IXAS_70.jpg	-	151	female	11	2	2	1	2	2	1	-	1	2	3	1	2	2	2	3	2	2	2	3	2	61%	33%
Sem 2	2013	OE2014_IXAS_71.jpg	-	103	female	11	0	0	0	0	0	0	-	0	0	0	0	1	0	0	0	0	0	0	1	0	89%	291%
Sem 2	2013	OE2014_IXAS_72.jpg	-	72	female	11	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	100%	0%
					Total read		92	92	92	92	92	92	0	92	91	92	92	92	91	92	81	92	92	92	92		68.6%	48.9%
					Total NOT read		0	0	0	0	0	0	92	0	1	0	0	0	1	0	11	0	0	0	0			

ANE_GSA01- Alboran Sea

Table 1 **Anchovy Otolith SET GSA01_Alboran Sea (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15 MODAL	Percent	Precision
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	age	agreement	CV
Sem 1	2013	02052013-001.jpg	-	142.0	female	5	0	2	3	3	2	1	-	1	2	2	1	2	2	2	4	3	2	3	3	2	44%	46%
Sem 1	2013	02052013-002.jpg	-	157.0	female	5	0	1	2	2	1	1	-	0	2	2	1	2	2	2	3	3	2	2	3	2	50%	52%
Sem 1	2013	02052013-003.jpg	-	155.0	male	5	0	1	1	2	1	1	-	0	2	2	1	2	2	2	3	0	2	1	3	2	39%	64%
Sem 1	2013	02052013-004.jpg	-	149.0	female	5	0	1	1	2	1	1	-	0	1	2	1	2	2	2	3	1	2	1	3	1	44%	59%
Sem 1	2013	02052013-005.jpg	-	139.0	male	5	0	1	1	2	0	0	-	0	1	2	1	1	1	1	3	1	1	1	2	1	56%	76%
Sem 1	2013	02052013-006.jpg	-	143.0	male	5	0	1	1	2	0	0	-	0	1	-	0	2	2	2	3	0	2	1	3	0	35%	91%
Sem 1	2013	02052013-007.jpg	-	140.0	female	5	0	1	1	1	1	1	-	0	1	2	1	1	1	1	2	2	1	-	3	1	65%	62%
Sem 1	2013	02052013-008.jpg	-	137.0	female	5	0	1	1	2	0	0	-	0	0	1	0	1	1	1	2	1	1	1	2	1	50%	85%
Sem 1	2013	02052013-009.jpg	-	147.0	female	5	0	1	2	1	1	1	-	0	1	2	1	2	2	2	3	2	2	2	3	2	44%	55%
Sem 1	2013	02052013-010.jpg	-	160.0	female	5	1	1	2	2	2	1	-	1	2	3	1	2	2	2	3	4	2	2	4	2	50%	46%
Sem 1	2013	02052013-011.jpg	-	151.0	female	5	0	1	1	2	1	1	-	0	1	3	1	2	2	2	3	2	1	2	3	1	39%	59%
Sem 1	2013	02052013-012.jpg	-	151.0	male	5	0	1	1	2	1	1	-	0	2	2	1	2	2	2	2	2	2	2	3	2	56%	50%
Sem 1	2013	02052013-013.jpg	-	140.0	male	5	0	1	1	2	0	0	-	0	1	2	1	2	2	1	3	2	1	2	3	1	33%	73%
Sem 1	2013	02052013-014.jpg	-	153.0	female	5	0	1	1	2	1	1	-	0	1	2	1	2	2	2	2	2	1	2	3	2	44%	54%
Sem 1	2013	02052013-015.jpg	-	147.0	female	5	0	1	1	1	1	1	-	0	-	2	1	2	2	1	2	1	1	1	2	1	59%	54%
Sem 1	2013	02052013-016.jpg	-	153.0	female	5	0	1	1	2	1	1	-	0	2	3	1	2	2	2	3	3	1	2	2	2	39%	57%
Sem 1	2013	02052013-017.jpg	-	145.0	female	5	1	1	1	2	1	1	-	0	2	2	1	2	2	2	3	2	1	2	2	2	50%	45%
Sem 1	2013	02052013-018.jpg	-	131.0	female	5	0	1	1	1	0	0	-	0	1	1	0	1	1	1	2	2	1	1	2	1	56%	76%
Sem 1	2013	02052013-019.jpg	-	134.0	male	5	0	0	1	1	0	0	-	0	2	1	0	1	1	1	-	1	1	2	2	1	47%	88%
Sem 1	2013	02052013-020.jpg	-	144.0	male	5	0	1	1	2	1	0	-	0	-	2	1	2	2	1	2	2	1	2	3	2	41%	64%
Sem 1	2013	02052013-021.jpg	-	133.0	male	5	0	1	1	2	1	0	-	0	1	1	1	2	2	1	2	1	1	2	2	1	50%	61%
Sem 1	2013	02052013-022.jpg	-	127.0	male	5	0	1	1	1	0	0	-	0	1	-	0	1	1	1	2	2	1	2	2	1	47%	79%
Sem 1	2013	02052013-023.jpg	-	127.0	female	5	0	0	1	1	0	0	-	0	1	1	0	1	1	1	-	1	1	1	2	1	59%	83%
Sem 1	2013	02052013-024.jpg	-	146.0	male	5	0	1	1	2	1	1	-	0	2	2	1	2	2	2	3	3	1	3	3	1	33%	58%
Sem 1	2013	02052013-025.jpg	-	132.0	male	5	0	1	1	1	1	0	-	0	1	1	0	1	1	1	-	2	1	1	2	1	65%	68%
Sem 1	2013	02052013-026.jpg	-	163.0	male	5	1	2	2	2	2	1	-	1	2	3	1	3	3	3	3	4	2	3	3	3	39%	39%
Sem 1	2013	02052013-027.jpg	-	137.0	female	5	0	1	1	2	0	0	-	0	1	1	0	1	1	1	2	1	1	1	2	1	56%	76%
Sem 1	2013	02052013-028.jpg	-	150.0	female	5	2	1	1	2	1	1	-	0	2	2	1	2	2	2	3	2	1	2	-	2	53%	45%
Sem 1	2013	02052013-029.jpg	-	143.0	male	5	0	1	1	2	1	1	-	0	2	2	1	2	2	2	-	3	1	2	3	2	41%	57%
Sem 1	2013	02052013-030.jpg	-	158.0	male	5	2	2	2	2	2	1	-	0	2	4	1	2	2	2	4	3	2	3	3	2	56%	45%
Sem 1	2013	02052013-041.jpg	-	119.0	male	5	0	0	1	1	0	0	-	0	0	1	0	1	1	1	-	0	1	0	2	0	53%	118%
Sem 1	2013	02052013-042.jpg	-	117.0	female	5	0	0	1	0	0	0	-	-	0	1	0	1	1	0	1	0	1	0	2	0	59%	133%
Sem 1	2013	02052013-043.jpg	-	116.0	female	5	0	0	1	1	0	0	-	0	0	1	0	1	1	0	1	1	0	1	1	0	50%	103%
Sem 1	2013	02052013-044.jpg	-	118.0	male	5	0	0	1	1	0	0	-	0	0	1	0	1	2	0	-	0	1	1	2	0	53%	121%
Sem 1	2013	02052013-045.jpg	-	117.0	male	5	0	0	1	0	0	0	-	0	0	1	0	1	1	0	-	0	1	0	1	0	65%	140%
Sem 2	2013	08082013-001.jpg	-	142.0	female	8	1	2	1	2	2	2	-	1	2	2	2	2	2	2	-	3	1	3	3	2	59%	34%
Sem 2	2013	08082013-002.jpg	-	154.0	female	8	1	2	1	3	2	2	-	1	3	3	2	3	3	2	-	4	2	3	4	2	35%	39%
Sem 2	2013	08082013-003.jpg	-	129.0	male	8	1	1	1	2	1	1	-	0	1	1	1	1	1	1	-	1	1	2	3	1	76%	54%
Sem 2	2013	08082013-004.jpg	-	162.0	female	8	2	3	2	3	3	2	-	2	4	4	2	2	2	2	-	5	2	3	4	2	53%	35%
Sem 2	2013	08082013-007.jpg	-	119.0	male	8	1	1	0	1	0	1	-	1	1	1	1	1	1	0	-	1	1	1	3	1	76%	70%
Sem 2	2013	08082013-008.jpg	-	143.0	male	8	2	2	2	3	2	2	-	1	2	3	2	2	2	2	-	5	2	3	4	2	65%	39%
Sem 2	2013	08082013-009.jpg	-	130.0	male	8	1	1	1	2	1	1	-	1	1	2	1	1	1	1	-	4	1	1	3	1	76%	62%
Sem 2	2013	08082013-010.jpg	-	142.0	female	8	1	2	1	3	1	2	-	1	2	2	2	2	2	2	-	3	2	2	3	2	59%	34%
Sem 2	2013	08082013-011.jpg	-	146.0	male	8	1	2	1	3	1	2	-	1	2	2	2	2	2	2	-	3	1	3	4	2	47%	43%
Sem 2	2013	08082013-013.jpg	-	137.0	female	8	1	1	1	2	1	1	-	1	1	1	1	1	2	1	-	3	1	2	3	1	71%	50%
Sem 2	2013	08082013-014.jpg	-	149.0	male	8	1	2	1	2	1	2	-	1	2	1	2	2	2	2	-	2	1	2	3	2	59%	34%
Sem 2	2013	08082013-015.jpg	-	162.0	female	8	1	2	2	3	2	2	-	2	2	3	2	3	3	2	-	5	2	4	4	2	53%	39%
Sem 2	2013	08082013-017.jpg	-	113.0	female	8	0	1	1	1	0	1	-	1	1	1	1	1	1	1	-	2	1	1	2	1	76%	50%
Sem 2	2013	08082013-021.jpg	-	149.0	female	8	1	2	2	3	1	2	-	1	2	2	2	2	2	2	-	3	2	3	3	2	59%	32%
Sem 2	2013	08082013-022.jpg	-	132.0	male	8	0	1	0	1	1	1	-	1	1	1	1	1	1	1	-	2	1	1	2	1	76%	50%
Sem 2	2013	08082013-023.jpg	-	137.0	male	8	1	1	0	2	1	1	-	1	1	-	1	2	2	1	-	3	1	1	3	1	63%	59%
Sem 2	2013	08082013-024.jpg	-	145.0	male	8	1	1	1	2	1	1	-	1	2	-	1	2	2	1	-	3	1	2	3	1	56%	47%
Sem 2	2013	08082013-025.jpg	-	134.0	female	8	1	1	0	1	1	1	-	1	2	-	1	1	2	1	-	3	1	1	3	1	69%	60%
Sem 2	2013	08082013-026.jpg	-	127.0	male	8	0	1	0	1	1	1	-	1	1	-	1	1	1	1	-	1	1	1	2	1	81%	47%
Sem 2	2013	08082013-027.jpg	-	122.0	male	8	1	1	1	1	1	1	-	1	2	-	1	1	1	1	-	1	1	1	3	1	88%	46%
Sem 2	2013	08082013-028.jpg	-	133.0	male	8	1	1	1	2	1	1	-	1	2	-	2	1	2	1	-	2	1	1	3	1	63%	44%
Sem 2	2013	08082013-029.jpg	-	150.0	female	8	1	2	2	2	2	2	-	1	3	-	2	2	2	2	-	4	2	2	4	2	69%	38%
Sem 2	2013	08082013-030.jpg	-	128.0	male	8	1	1	1	1	1	1	-	1	1	-	1	1	1	1	-	2	1	1	3	1	88%	46%
Sem 2	2013	08082013-031.jpg	-	113.0	male	8	1	1	1	1	1	1	-	1	1	-	1	1	1	1	-	2	1	1	2	1	88%	30%
Sem 2	2013	08082013-032.jpg	-	141.0	male	8	1	1	1	3	1	-	-	1	3	-	2	2	3	1	-	3	1	2	3	1	47%	49%
Sem 2	2013	08082013-033.jpg	-	130.0	male	8	0	1	0	2	1	1	-	1	2	-	1	1	1	1	-	3	1	1	2	1	63%	63%
Sem 2	2013	08082013-034.jpg	-	123.0	male	8	0	1	0	1	1	1	-	1	1	-	1	1	1	1	-	2	1	1	2	1	75%	52%
Sem 2	2013	08082013-035.jpg	-	107.0	male	8	0	1	0	1	0	1	-	1	1	-	1	1	1	1	-	1	0	1	1	1	75%	60%
Sem 2	2013	08082013-036.jpg	-	108.0	male	8	0	1	0	0	0	1	-	1	1	-	1	1	1	1	-	1	0	1	1	1	69%	70%
Sem 2	2013	08082013-039.jpg	-	126.0	male	8	1	1	0	1	1	1	-	1	1	-	1	1	1	1	-	2	1	1	2	1	81%	42%
Sem 2	2013	08082013-040.jpg	-	109.0	male	8	1	1	0	1	0	1	-	1	1	-	1	1	1	0	-	1	0	1	1	1	75%	60%
Sem 2	2013	08082013-042.jpg	-	116.0	male	8	1	1	0	1	1	1	-	1	1	-	1	1	1	1	-	1	1	1	2	1	88%	37%
Sem 2	2013	08082013-044.jpg	-	110.0	male	8	1	1	0	1	1	1	-	1	1	-	1	1	1	1	-	1	0	1	1	1	88%	39%
Sem 2	2013	08082013-045.jpg	-	114.0	male	8	1	1	0	1	1	1	-	1	1	-	1	2	1	1	-	1	1	1	1	1	88%	37%
Sem 2	2013	08082013-046.jpg	-	116.0	male	8	1	1	0	1	1	1	-	1	1	-	1	1	1	0	-	1	1	1	1	1	88%	39%
					Total read		70	70	70	70	70	69	0	69	68	48	70	70	70	70	28	70	70	69	69		**59.4%**	**58.7%**
					Total NOT read		0	0	0	0	0	1	70	1	2	22	0	0	0	0	42	0	0	1	1			

ANE_GSA06- Western Mediterranean

Table 1 **Anchovy Otolith SET GSA06_Western Mediterranean (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreement	Precision CV
Sem 1	2013	10042013-001.jpg	-	114.0	male	4	0	0	1	1	0	1	-	0	1	1	1	1	1	1	1	2	1	1	1	1	72%	62%
Sem 1	2013	10042013-002.jpg	-	118.0	female	4	0	0	1	1	0	1	-	0	1	1	1	1	1	1	1	2	1	1	2	1	67%	66%
Sem 1	2013	10042013-004.jpg	-	117.0	female	4	0	0	1	1	0	1	-	0	1	1	1	1	1	1	1	3	1	2	1	1	67%	77%
Sem 1	2013	10042013-006.jpg	-	115.0	female	4	0	0	1	0	0	1	-	0	1	1	1	1	1	1	1	1	1	2	1	1	67%	70%
Sem 1	2013	10042013-007.jpg	-	123.0	female	4	1	2	2	1	0	1	-	1	2	1	1	2	2	1	2	1	1	2	2	1	50%	44%
Sem 1	2013	10042013-008.jpg	-	121.0	female	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	1	1	1	2	1	76%	55%
Sem 1	2013	10042013-011.jpg	-	125.0	male	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	2	1	1	1	1	76%	55%
Sem 1	2013	10042013-012.jpg	-	126.0	male	4	1	1	2	0	0	1	-	0	1	-	1	1	1	1	2	1	1	1	2	1	65%	61%
Sem 1	2013	10042013-016.jpg	-	127.0	male	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	-	1	1	1	2	1	75%	57%
Sem 1	2013	10042013-018.jpg	-	131.0	female	4	1	2	1	1	0	1	-	0	2	-	1	1	1	1	2	2	1	1	2	1	59%	54%
Sem 1	2013	10042013-019.jpg	-	132.0	male	4	1	2	3	1	0	1	-	0	2	-	1	1	1	2	2	2	1	2	3	1	41%	59%
Sem 1	2013	10042013-020.jpg	-	130.0	male	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	2	1	2	2	1	65%	61%
Sem 1	2013	10042013-022.jpg	-	135.0	female	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	2	1	2	2	1	65%	61%
Sem 1	2013	10042013-023.jpg	-	135.0	female	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	2	1	2	2	1	65%	61%
Sem 1	2013	10042013-024.jpg	-	135.0	female	4	0	1	1	1	0	1	-	0	1	-	1	1	1	1	1	1	1	2	2	1	71%	59%
Sem 1	2013	10042013-025.jpg	-	136.0	female	4	0	1	2	1	0	1	-	0	1	-	1	1	1	1	1	2	1	2	2	1	59%	62%
Sem 1	2013	10042013-027.jpg	-	140.0	female	4	0	1	1	2	0	1	-	0	-	2	1	2	2	1	1	1	2	2	2	1	41%	61%
Sem 1	2013	10042013-029.jpg	-	142.0	male	4	1	1	1	1	0	1	-	0	2	2	1	2	2	1	2	2	1	1	2	1	50%	52%
Sem 1	2013	10042013-030.jpg	-	142.0	male	4	0	1	1	1	0	1	-	0	1	2	1	2	2	1	1	2	2	2	2	1	44%	60%
Sem 1	2013	10042013-031.jpg	-	150.0	male	4	2	2	3	2	1	1	-	1	2	3	2	2	2	2	3	2	2	2	2	2	67%	30%
Sem 1	2013	10042013-032.jpg	-	144.0	female	4	0	1	1	2	0	1	-	0	1	2	1	2	2	1	2	3	2	2	3	2	39%	64%
Sem 1	2013	10042013-033.jpg	-	146.0	female	4	1	1	2	2	1	1	-	0	1	2	1	2	2	1	2	2	2	2	3	2	50%	45%
Sem 1	2013	05062013-033.jpg	-	147.0	female	6	0	1	2	1	1	1	-	0	2	2	1	2	2	2	2	2	2	2	2	2	61%	47%
Sem 1	2013	05062013-034.jpg	-	149.0	female	6	0	1	1	1	0	1	-	0	1	2	1	2	2	1	1	1	1	1	2	1	61%	61%
Sem 1	2013	05062013-035.jpg	-	145.0	female	6	0	1	2	1	0	1	-	0	2	2	1	2	2	1	1	3	1	1	2	1	44%	65%
Sem 1	2013	05062013-036.jpg	-	147.0	female	6	0	1	1	1	0	1	-	0	1	2	1	2	2	1	1	2	2	1	2	1	50%	61%
Sem 1	2013	05062013-037.jpg	-	146.0	female	6	1	2	2	1	1	1	-	0	1	2	1	2	2	2	2	2	2	2	2	2	61%	40%
Sem 1	2013	05062013-038.jpg	-	152.0	male	6	0	1	1	1	0	1	-	0	1	3	1	2	2	2	1	1	1	2	3	1	50%	70%
Sem 1	2013	05062013-039.jpg	-	152.0	female	6	0	1	1	1	0	1	-	0	1	3	1	2	2	1	1	1	1	2	3	1	56%	72%
Sem 1	2013	05062013-040.jpg	-	153.0	female	6	0	1	1	1	0	1	-	0	1	2	1	2	2	1	1	1	1	3	2	1	56%	67%
Sem 2	2013	1308013-005.jpg	-	114.0	male	8	1	1	2	1	1	1	-	0	1	2	1	1	1	1	0	2	1	2	2	1	61%	53%
Sem 2	2013	1308013-007.jpg	-	111.0	male	8	1	1	2	1	1	1	-	1	1	1	1	1	1	1	0	2	1	1	2	1	78%	42%
Sem 2	2013	1308013-008.jpg	-	119.0	female	8	1	1	2	1	1	1	-	1	1	1	1	1	1	1	0	2	1	2	2	1	72%	44%
Sem 2	2013	1308013-011.jpg	-	118.0	male	8	2	1	1	1	1	1	-	1	1	1	1	2	1	1	0	2	1	2	2	1	67%	45%
Sem 2	2013	1308013-013.jpg	-	120.0	female	8	1	1	2	1	1	1	-	1	1	1	1	1	1	1	-	2	1	2	2	1	76%	35%
Sem 2	2013	1308013-015.jpg	-	122.0	female	8	2	1	2	1	1	1	-	1	1	1	1	1	1	1	1	2	1	2	3	1	72%	45%
Sem 2	2013	1308013-016.jpg	-	128.0	female	8	1	2	1	1	1	1	-	1	2	1	1	1	1	1	1	2	1	2	3	1	72%	45%
Sem 2	2013	1308013-017.jpg	-	126.0	female	8	1	2	1	1	1	2	-	1	2	1	1	1	1	1	1	2	1	3	3	1	67%	49%
Sem 2	2013	1308013-018.jpg	-	127.0	female	8	1	2	1	1	1	1	-	1	1	1	1	1	1	1	1	3	1	1	3	1	83%	52%
Sem 2	2013	1308013-019.jpg	-	126.0	female	8	1	2	1	1	1	1	-	1	-	1	1	1	1	1	0	2	1	2	3	1	71%	54%
Sem 2	2013	1308013-020.jpg	-	130.0	male	8	1	2	1	1	1	2	-	1	1	2	1	1	1	1	0	3	1	2	3	1	61%	56%
Sem 2	2013	1308013-021.jpg	-	130.0	female	8	1	2	1	1	1	2	-	1	2	2	2	1	1	1	1	3	1	1	2	1	61%	43%
Sem 2	2013	1308013-022.jpg	-	132.0	male	8	1	2	1	2	1	2	-	1	2	2	2	1	2	2	1	3	2	2	2	2	61%	33%
Sem 2	2013	1308013-023.jpg	-	134.0	female	8	1	2	1	2	1	2	-	1	2	3	2	2	1	2	1	3	2	2	3	2	50%	39%
Sem 2	2013	1308013-024.jpg	-	136.0	female	8	1	2	1	2	1	2	-	1	0	2	2	2	1	2	1	3	2	2	3	2	50%	46%
Sem 2	2013	1308013-025.jpg	-	137.0	female	8	2	2	2	1	1	2	-	1	2	2	2	1	1	2	1	3	2	2	3	2	56%	36%
Sem 2	2013	1308013-026.jpg	-	137.0	male	8	1	2	2	2	1	2	-	1	2	2	2	1	1	2	1	3	2	2	3	2	56%	36%
Sem 2	2013	1308013-027.jpg	-	139.0	female	8	0	2	1	1	1	2	-	1	1	1	1	1	1	1	1	2	1	1	3	1	72%	53%
Sem 2	2013	1308013-028.jpg	-	140.0	female	8	1	2	1	1	1	2	-	1	1	2	1	1	1	1	1	2	1	2	3	1	67%	44%
Sem 2	2013	1308013-029.jpg	-	140.0	female	8	1	2	1	1	1	2	-	1	2	3	2	2	1	2	1	3	2	3	3	1	39%	43%
Sem 2	2013	1308013-030.jpg	-	142.0	male	8	3	2	1	2	1	2	-	1	3	3	2	2	1	2	1	4	2	2	3	2	44%	42%
Sem 2	2013	1308013-031.jpg	-	141.0	female	8	1	2	2	2	1	2	-	1	-	3	2	2	1	2	1	4	2	2	3	2	53%	43%
Sem 2	2013	1308013-032.jpg	-	143.0	male	8	1	2	2	2	1	2	-	1	2	3	2	2	2	2	2	3	2	3	4	2	61%	36%
Sem 2	2013	1308013-033.jpg	-	145.0	female	8	1	2	2	2	2	2	-	2	2	2	2	2	2	2	2	3	2	2	3	2	83%	20%
Sem 2	2013	1308013-034.jpg	-	146.0	male	8	1	2	1	2	1	2	-	1	2	2	2	2	2	2	1	3	2	2	3	2	61%	34%
Sem 2	2013	1308013-035.jpg	-	145.0	male	8	1	2	2	2	1	2	-	1	2	2	2	2	2	2	1	3	2	3	3	2	61%	33%
Sem 2	2013	2008013-033.jpg	-	150.0	male	8	2	2	1	2	2	2	-	1	2	3	2	3	2	2	2	4	2	3	4	2	61%	36%
Sem 2	2013	2008013-034.jpg	-	145.0	female	8	2	3	2	2	2	3	-	2	2	3	3	2	2	2	2	3	2	3	3	2	61%	21%
Sem 2	2013	2008013-035.jpg	-	145.0	female	8	2	3	1	1	1	2	-	2	1	3	2	2	2	2	2	3	2	2	3	2	56%	34%
Sem 2	2013	2008013-036.jpg	-	165.0	female	8	1	2	1	2	2	2	-	1	2	4	2	2	2	2	1	3	2	4	4	2	56%	45%
					Total read		60	60	60	60	60	60	0	60	57	49	60	60	60	60	58	60	60	60	60		**61.0%**	**49.9%**
					Total NOT read		0	0	0	0	0	0	60	0	3	11	0	0	0	0	2	0	0	0	0			

ANE_GSA07- Gulf of Lion

Table 1 **Anchovy Otolith SET GSA07_Gulf of Lion (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreemen	Precision CV
Sem 1	2014	B_14_b20_O_0020.jp	-	135.0	F	1	2	3	4	3	2	2	-	2	3	2	3	2	2	2	2	2	2	3	3	2	61%	25%
Sem 1	2014	B_14_b20_O_0042.jp	-	140.0	F	2	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	2	2	2	100%	0%
Sem 1	2014	B_14_b20_O_0043.jp	-	140.0	F	2	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	2	2	4	3	2	89%	24%
Sem 1	2014	B_14_b20_O_0046.jp	-	105.0	M	2	1	2	2	2	1	2	-	1	2	1	2	1	1	1	2	2	1	1	2	1	50%	34%
Sem 1	2014	B_14_b20_O_0049.jp	-	115.0	F	2	2	2	2	2	1	2	-	1	2	1	2	1	1	1	2	2	1	2	2	2	61%	31%
Sem 1	2014	B_14_b20_O_0050.jp	-	130.0	F	2	3	2	3	2	1	2	-	1	1	1	2	1	2	2	2	2	1	2	-	2	53%	38%
Sem 1	2014	B_14_b20_O_0055.jp	-	145.0	F	2	2	2	2	2	2	3	-	2	2	2	3	2	2	2	3	3	2	2	2	2	78%	19%
Sem 1	2014	B_14_b20_O_0059.jp	-	125.0	M	2	2	2	2	2	1	2	-	1	2	1	2	1	2	2	2	3	1	1	2	2	61%	33%
Sem 1	2014	B_14_b20_O_0060.jp	-	125.0	F	2	2	2	2	2	2	2	-	2	2	2	2	2	2	2	2	3	2	2	2	2	94%	11%
Sem 1	2014	B_14_b20_O_0064.jp	-	130.0	F	2	2	2	2	2	2	2	-	2	2	1	-	2	2	2	2	2	2	2	2	2	94%	12%
Sem 1	2014	B_14_b20_O_0065.jp	-	110.0	M	2	2	2	2	2	1	2	-	1	2	1	2	1	1	1	1	2	1	1	2	2	50%	34%
Sem 1	2014	B_14_b20_O_0069.jp	-	135.0	F	2	2	2	2	2	2	2	-	2	2	1	2	2	2	2	2	3	2	2	2	2	89%	17%
Sem 1	2014	B_14_b20_O_0076.jp	-	100.0	F	2	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	100%	0%
Sem 1	2014	B_14_b20_O_0079.jp	-	120.0	F	2	2	2	2	2	2	2	-	2	2	1	2	1	2	2	2	2	2	3	2	2	83%	21%
Sem 1	2014	B_14_b20_O_0070.jp	-	105.0	undefined	2	2	2	2	2	1	2	-	1	2	1	2	1	1	1	2	2	1	1	1	2	50%	34%
Sem 1	2014	B_14_b20_O_0037.jp	-	110.0	M	2	2	2	2	1	1	2	-	1	1	1	2	1	1	1	1	1	1	1	2	1	67%	36%
Sem 1	2014	B_14_b20_O_0047.jp	-	115.0	F	2	2	2	2	2	1	2	-	1	2	1	2	1	1	1	2	2	1	1	2	2	56%	33%
Sem 1	2014	B_14_b20_O_0074.jp	-	120.0	F	2	3	2	3	2	1	2	-	2	1	1	2	1	1	1	1	2	1	2	2	2	44%	41%
Sem 2	2014	B_14_b18_O_0150.jp	-	94.0	M	7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	0	1	2	1	89%	34%
Sem 2	2014	B_14_b18_O_0166.jp	-	100.0	M	7	1	1	1	0	1	1	-	1	1	1	1	1	1	1	1	1	1	0	2	1	83%	44%
Sem 2	2014	B_14_b18_O_0148.jp	-	105.0	undefined	7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	2	1	94%	22%
Sem 2	2014	B_14_b18_O_0146.jp	-	111.0	M	7	1	1	1	1	1	1	-	1	1	2	1	1	1	1	1	1	1	1	2	1	89%	29%
Sem 2	2014	B_14_b18_O_0147.jp	-	112.0	M	7	1	1	1	1	1	1	-	1	1	2	1	1	1	1	1	1	1	1	2	1	89%	29%
Sem 2	2014	B_14_b18_O_0134.jp	-	118.0	M	7	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	100%	0%
Sem 2	2014	B_14_b18_O_0142.jp	-	119.0	M	7	2	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1	3	1	89%	44%
Sem 2	2014	B_14_b18_O_0139.jp	-	121.0	M	7	3	1	1	1	1	2	-	1	2	2	2	1	1	1	2	1	1	2	3	1	56%	45%
Sem 2	2014	B_14_b18_O_0133.jp	-	122.0	M	7	3	1	1	1	1	1	-	1	1	2	1	1	1	1	2	1	1	1	3	1	78%	51%
Sem 2	2014	B_14_b18_O_0135.jp	-	123.0	M	7	3	1	2	1	1	1	-	1	2	1	1	1	1	1	1	2	1	2	3	1	67%	49%
Sem 2	2014	B_14_b18_O_0136.jp	-	124.0	M	7	3	1	2	1	1	2	-	1	2	1	2	1	1	1	2	1	1	1	3	1	61%	47%
Sem 2	2014	B_14_b18_O_0127.jp	-	125.0	M	7	2	1	1	1	1	1	-	1	1	2	1	1	1	1	-	1	1	1	3	1	82%	46%
Sem 2	2014	B_14_b18_O_0130.jp	-	126.0	M	7	3	2	2	1	1	2	-	2	2	3	2	1	1	1	2	2	2	1	3	2	50%	39%
Sem 2	2014	B_14_b18_O_0129.jp	-	128.0	F	7	2	1	1	1	1	1	-	1	1	2	1	1	1	1	1	1	2	1	3	1	78%	45%
Sem 2	2014	B_14_b18_O_0124.jp	-	131.0	F	7	2	1	1	1	1	1	-	1	2	2	1	1	1	1	2	1	1	1	3	1	72%	45%
Sem 2	2014	B_14_b18_O_0177.jp	-	140.0	F	7	2	1	1	1	2	2	-	2	2	2	2	1	1	2	2	1	2	2	3	2	61%	33%
Sem 2	2014	B_14_b18_O_0178.jp	-	141.0	F	7	2	2	2	2	2	2	-	2	2	3	2	1	2	2	2	2	2	2	3	2	83%	20%
Sem 2	2014	B_14_b18_O_0175.jp	-	142.0	F	7	2	1	1	2	1	2	-	2	1	2	2	1	2	2	2	1	2	2	3	2	61%	33%
Sem 2	2014	B_14_b18_O_0176.jp	-	143.0	F	7	2	1	1	1	1	1	-	2	2	2	1	1	1	1	1	1	2	2	3	1	61%	43%
Sem 2	2014	B_14_b18_O_0179.jp	-	143.0	F	7	2	1	1	1	1	1	-	1	2	2	1	2	2	1	1	1	1	1	3	1	67%	44%
					Total read		38	38	38	38	38	38	0	38	38	38	37	38	38	38	37	38	38	38	37		**73.4%**	**31.3%**
					Total NOT read		0	0	0	0	0	0	38	0	0	0	1	0	0	0	1	0	0	0	1			

ANE_GSA10- Southern Tyrrhenian

Table 1 **Anchovy Otolith SET GSA10_Southern Thyrrenian (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreement	Precision CV
Sem 1	2012	GSA10_31.jpg	-	100.0	F	5	0	1	1	0	0	1	-	0	1	1	1	1	1	1	1	1	1	0	1	1	72%	64%
Sem 1	2012	GSA10_32.jpg	-	100.0	M	5	0	1	1	0	0	1	-	0	0	1	1	1	1	1	1	1	1	-	1	1	71%	67%
Sem 1	2012	GSA10_33.jpg	-	105.0	F	5	0	1	1	1	0	1	-	0	0	1	1	1	1	1	1	1	1	1	1	1	78%	55%
Sem 1	2012	GSA10_34.jpg	-	105.0	M	5	0	1	2	0	0	1	-	0	0	1	1	1	1	1	1	1	1	1	1	1	67%	70%
Sem 1	2012	GSA10_35.jpg	-	110.0	M	5	0	1	1	1	0	1	-	0	0	1	1	1	1	1	1	1	1	1	2	1	72%	62%
Sem 1	2012	GSA10_36.jpg	-	110.0	F	5	0	1	1	0	0	1	-	0	0	1	1	1	1	1	1	1	1	0	1	1	67%	73%
Sem 1	2012	GSA10_37.jpg	-	115.0	F	5	0	1	1	1	0	1	-	0	0	1	1	1	1	1	1	1	1	1	2	1	72%	62%
Sem 1	2012	GSA10_38.jpg	-	115.0	F	5	0	1	1	1	0	0	-	0	0	1	0	1	1	1	1	1	1	2	2	1	56%	83%
Sem 1	2012	GSA10_39.jpg	-	115.0	M	5	0	1	1	1	0	1	-	0	1	1	1	1	1	1	1	1	1	1	2	1	78%	53%
Sem 1	2012	GSA10_40.jpg	-	115.0	M	5	0	1	1	1	0	0	-	0	0	0	0	1	1	1	1	0	1	1	2	1	50%	99%
Sem 1	2012	GSA10_41.jpg	-	120.0	M	5	0	1	1	1	0	1	-	0	0	1	1	1	1	1	1	1	1	1	2	1	72%	62%
Sem 1	2012	GSA10_42.jpg	-	120.0	M	5	0	1	1	1	0	1	-	0	0	1	0	1	1	1	1	1	1	1	1	1	72%	64%
Sem 1	2012	GSA10_43.jpg	-	120.0	F	5	0	1	1	1	0	1	-	0	1	1	1	1	1	1	1	1	1	1	1	1	83%	46%
Sem 1	2012	GSA10_44.jpg	-	120.0	F	5	0	1	2	1	0	1	-	0	1	1	1	1	1	1	1	1	1	2	1	1	72%	57%
Sem 1	2012	GSA10_45.jpg	-	125.0	F	5	0	1	2	1	0	0	-	0	0	1	0	1	1	1	1	0	1	0	2	0	44%	103%
Sem 1	2012	GSA10_46.jpg	-	125.0	F	5	0	1	1	2	0	1	-	0	1	1	1	2	2	2	1	1	2	2	2	1	44%	60%
Sem 1	2012	GSA10_47.jpg	-	125.0	M	5	1	1	1	1	0	1	-	0	1	2	1	2	2	1	1	1	1	1	2	1	67%	52%
Sem 1	2012	GSA10_48.jpg	-	125.0	M	5	0	1	1	1	0	1	-	0	1	1	1	1	1	1	1	1	1	1	2	1	78%	53%
Sem 1	2012	GSA10_49.jpg	-	130.0	F	5	0	1	1	1	0	0	-	0	1	1	0	1	1	1	1	1	1	1	2	1	67%	70%
Sem 1	2012	GSA10_50.jpg	-	130.0	F	5	0	1	1	1	0	0	-	0	1	1	0	1	1	1	1	1	1	2	2	1	61%	74%
Sem 1	2012	GSA10_51.jpg	-	130.0	F	5	0	1	1	2	0	1	-	0	1	2	1	2	2	2	2	1	1	2	2	2	44%	59%
Sem 1	2012	GSA10_52.jpg	-	95.0	F	5	0	1	1	0	0	0	-	0	0	0	0	0	0	1	1	1	0	1	1	0	61%	129%
Sem 1	2012	GSA10_53.jpg	-	95.0	F	5	0	1	1	0	0	0	-	0	1	1	0	0	0	1	1	1	0	0	1	0	56%	115%
Sem 1	2012	GSA10_54.jpg	-	95.0	M	5	0	1	1	0	0	0	-	0	0	0	0	0	0	1	1	1	0	0	1	0	67%	146%
Sem 1	2012	GSA10_55.jpg	-	95.0	M	5	0	0	1	0	0	0	-	0	0	0	0	0	0	0	1	1	0	0	1	0	78%	193%
Sem 2	2013	GSA10_01.jpg	-	110.0	F	8	1	2	2	2	1	2	-	1	1	3	2	1	1	2	1	3	1	2	3	1	44%	44%
Sem 2	2013	GSA10_02.jpg	-	110.0	F	8	1	2	1	1	1	0	-	1	1	2	2	1	1	1	1	2	1	2	2	1	61%	45%
Sem 2	2013	GSA10_03.jpg	-	110.0	M	8	1	2	1	1	1	2	-	1	1	2	2	1	1	1	1	2	1	2	2	1	61%	36%
Sem 2	2013	GSA10_04.jpg	-	115.0	M	8	1	2	1	2	1	2	-	1	1	2	2	1	1	1	1	2	1	2	2	1	56%	35%
Sem 2	2013	GSA10_05.jpg	-	115.0	M	8	-	2	1	2	1	2	-	1	1	2	2	1	1	1	1	2	1	2	2	1	53%	35%
Sem 2	2013	GSA10_06.jpg	-	115.0	F	8	1	2	1	2	1	2	-	1	1	3	2	1	1	1	1	2	1	2	2	1	56%	41%
Sem 2	2013	GSA10_07.jpg	-	130.0	M	8	2	3	2	2	2	2	-	2	2	3	2	2	2	2	2	3	2	3	3	2	72%	20%
Sem 2	2013	GSA10_08.jpg	-	135.0	M	8	1	2	1	2	1	2	-	1	1	2	2	2	2	2	1	2	1	2	2	2	61%	31%
Sem 2	2013	GSA10_09.jpg	-	135.0	M	8	2	2	2	2	2	2	-	2	2	2	2	2	2	2	1	3	2	2	2	2	89%	17%
Sem 2	2013	GSA10_10.jpg	-	140.0	M	8	2	2	2	2	2	2	-	2	3	3	2	2	2	2	1	3	2	3	3	2	67%	25%
Sem 2	2013	GSA10_11.jpg	-	145.0	M	8	1	3	2	2	2	2	-	1	2	3	2	2	2	2	1	3	2	2	3	2	61%	31%
Sem 2	2013	GSA10_12.jpg	-	150.0	F	8	2	3	2	2	2	2	-	2	2	3	2	2	2	2	2	3	2	3	3	2	72%	20%
Sem 2	2012	GSA10_13.jpg	-	125.0	M	9	1	2	2	1	1	2	-	1	1	2	2	1	1	1	1	3	1	2	2	1	56%	41%
Sem 2	2012	GSA10_14.jpg	-	125.0	F	9	1	2	3	2	1	2	-	1	2	3	2	1	1	2	1	4	1	3	3	1	39%	48%
Sem 2	2012	GSA10_15.jpg	-	135.0	M	9	1	2	2	2	1	2	-	1	2	3	2	1	1	2	1	3	2	3	3	2	44%	40%
Sem 2	2012	GSA10_16.jpg	-	140.0	F	9	1	2	1	2	1	2	-	1	2	2	2	1	1	2	1	3	2	2	3	2	50%	39%
Sem 2	2012	GSA10_17.jpg	-	140.0	M	9	1	2	1	2	2	2	-	1	2	2	2	2	2	2	1	3	2	3	3	2	61%	33%
Sem 2	2012	GSA10_18.jpg	-	145.0	M	9	1	2	2	2	2	2	-	1	2	2	2	2	2	2	1	3	2	3	3	2	67%	30%
Sem 2	2012	GSA10_19.jpg	-	145.0	M	9	1	2	1	2	2	2	-	1	2	2	2	2	2	2	1	3	2	3	3	2	61%	33%
Sem 2	2012	GSA10_20.jpg	-	145.0	F	9	1	2	1	2	2	2	-	2	2	2	2	2	2	2	1	3	2	2	3	2	72%	28%
Sem 2	2012	GSA10_21.jpg	-	150.0	F	9	1	2	1	2	2	2	-	1	2	2	2	2	2	2	1	2	2	3	3	2	67%	31%
Sem 2	2012	GSA10_22.jpg	-	150.0	F	9	1	2	1	2	2	2	-	2	2	2	2	2	2	2	1	2	1	2	3	2	72%	28%
Sem 2	2012	GSA10_23.jpg	-	80.0	U	8	0	1	0	0	0	1	-	1	0	0	1	0	0	0	0	1	0	1	0	0	67%	146%
Sem 2	2012	GSA10_24.jpg	-	80.0	U	8	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	1	0	61%	129%
Sem 2	2012	GSA10_25.jpg	-	85.0	U	8	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	1	0	61%	129%
Sem 2	2012	GSA10_26.jpg	-	85.0	U	8	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	0	0	67%	146%
Sem 2	2012	GSA10_27.jpg	-	90.0	F	8	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	1	0	61%	129%
Sem 2	2012	GSA10_28.jpg	-	90.0	F	8	0	1	0	0	0	1	-	1	0	1	1	1	0	0	0	1	0	1	1	0	50%	103%
Sem 2	2012	GSA10_29.jpg	-	90.0	M	8	0	1	0	0	0	1	-	1	0	1	1	1	0	0	0	1	0	1	1	0	50%	103%
Sem 2	2012	GSA10_30.jpg	-	90.0	M	8	0	1	0	-	0	1	-	1	0	1	1	1	0	0	0	1	0	0	1	0	53%	109%
					Total read		54	55	55	54	55	55	0	55	55	55	55	55	55	55	55	55	55	54	55		**62.9%**	**67.2%**
					Total NOT read		1	0	0	1	0	0	55	0	0	0	0	0	0	0	0	0	0	1	0			

ANE_GSA16- Strait of Sicily

Table 1 **Anchovy Otolith SET GSA16-Strait of Sicily (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreemen	Precision CV
Sem 1	2010	CB2010(10-5-10)_6(40x).jpg	-	96.0	undefined	5	-	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	94%	412%
Sem 1	2010	CB2010(10-5-10)_15(40x).jpg	-	98.0	undefined	5	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	94%	424%
Sem 1	2010	CB2010(10-5-10)_27(40x).jpg	-	85.0	undefined	5	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	94%	424%
Sem 1	2010	CB2010(10-5-10)_28(40x).jpg	-	94.0	undefined	5	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	1	0	89%	291%
Sem 1	2010	CB2010(10-5-10)_40(40x).jpg	-	90.0	undefined	5	0	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	94%	424%
Sem 1	2010	CB2010(10-5-10)_47(40x).jpg	-	83.0	undefined	5	-	0	1	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	94%	412%
Sem 1	2010	CB2010(13-4-10)_5(32x).jpg	-	131.0	male	4	1	1	2	1	0	1	-	0	1	1	1	1	1	1	1	1	1	2	2	1	72%	51%
Sem 1	2010	CB2010(13-4-10)_27(40x).jpg	-	115.0	male	4	1	1	2	1	0	1	-	1	1	1	1	1	1	2	1	2	1	1	2	1	72%	44%
Sem 1	2010	CB2010(10-5-10)_16(40x).jpg	-	114.0	male	5	0	0	2	1	0	1	-	0	2	1	1	1	1	1	1	1	1	1	1	1	67%	66%
Sem 1	2010	CB2010(10-5-10)_17(40x).jpg	-	108.0	male	5	0	0	1	1	0	0	-	0	0	0	0	1	1	0	1	0	0	0	1	0	67%	146%
Sem 1	2010	CB2010(10-5-10)_19(40x).jpg	-	112.0	male	5	0	0	1	1	0	1	-	0	1	1	1	1	1	1	1	1	1	1	1	1	78%	55%
Sem 1	2010	CB2010(10-5-10)_36(40x).jpg	-	105.0	female	5	1	1	2	1	0	1	-	0	2	1	1	1	1	1	1	1	1	2	2	1	67%	52%
Sem 1	2010	CB2010(7-4-10)_2(32x).jpg	-	131.0	male	4	1	1	2	1	1	0	-	1	1	2	1	1	1	1	1	2	1	2	3	1	67%	52%
Sem 1	2010	CB2010(7-4-10)_11(32x).jpg	-	132.0	female	4	0	1	2	1	1	1	-	1	2	2	1	1	1	1	2	2	1	2	3	1	56%	50%
Sem 1	2010	CB2010(7-4-10)_15(32x).jpg	-	133.0	male	4	0	1	2	1	1	1	-	1	2	2	1	1	1	1	2	2	2	1	1	3	1	56%	50%
Sem 1	2010	CB2010(7-4-10)_16(32x).jpg	-	129.0	male	4	0	1	1	1	1	1	-	1	1	1	1	1	1	1	2	2	1	2	3	1	72%	53%
Sem 1	2010	CB2010(7-4-10)_19(32x).jpg	-	149.0	female	4	1	1	2	2	1	1	-	1	2	2	1	1	2	1	2	2	1	2	3	1	50%	40%
Sem 1	2010	CB2010(7-4-10)_25(32x).jpg	-	141.0	male	4	0	1	1	1	1	1	-	1	1	2	1	1	1	1	2	3	1	2	3	1	67%	58%
Sem 1	2010	CB2010(7-4-10)_27(32x).jpg	-	128.0	male	4	0	1	2	1	0	1	-	0	2	1	1	1	1	1	1	2	1	2	2	1	56%	61%
Sem 1	2010	CB2010(18-5-10)_1(32x).jpg	-	128.0	male	5	0	1	1	1	1	1	-	1	1	1	1	1	1	1	2	2	1	2	2	1	72%	44%
Sem 1	2010	CB2010(18-5-10)_8(32x).jpg	-	130.0	male	5	2	1	3	1	1	1	-	1	2	2	1	1	1	2	2	3	1	2	2	1	50%	43%
Sem 1	2010	CB2010(18-5-10)_14(32x).jpg	-	128.0	male	5	0	1	2	1	1	1	-	1	1	1	1	1	1	1	2	1	1	2	2	1	72%	44%
Sem 1	2010	CB2010(18-5-10)_24(32x).jpg	-	136.0	female	5	0	1	3	1	1	1	-	1	2	2	1	1	1	2	2	2	1	2	2	1	50%	49%
Sem 1	2010	CB2010(7-4-10)_12(32x).jpg	-	147.0	female	4	2	1	2	2	1	2	-	1	3	2	2	2	2	2	2	2	2	2	3	2	72%	28%
Sem 1	2010	CB2010(7-4-10)_17(32x).jpg	-	144.0	female	4	0	1	1	2	1	1	-	1	2	2	1	2	2	1	2	3	1	2	3	1	44%	50%
Sem 1	2010	CB2010(7-4-10)_22(32x).jpg	-	144.0	female	4	1	1	2	2	1	1	-	1	3	3	1	2	2	2	2	4	1	3	3	1	39%	48%
Sem 1	2010	CB2010(7-4-10)_23(32x).jpg	-	143.0	male	4	0	1	3	2	1	1	-	1	2	2	1	2	2	2	1	3	1	2	3	1	39%	50%
Sem 1	2010	CB2010(7-4-10)_31(32x).jpg	-	158.0	male	4	1	1	2	2	1	1	-	1	2	3	1	2	2	2	2	2	1	3	4	2	44%	47%
Sem 1	2010	CB2010(26-4-10)_3(32x).jpg	-	135.0	female	4	1	1	1	1	1	1	-	0	3	1	1	2	2	2	2	2	1	3	2	1	50%	52%
Sem 1	2010	CB2010(18-5-10)_18(32x).jpg	-	133.0	female	5	1	1	3	1	1	1	-	1	3	2	1	2	2	3	2	3	1	2	3	1	44%	47%
Sem 1	2010	CB2010(18-5-10)_29(32x).jpg	-	140.0	female	5	2	1	2	2	1	1	-	0	2	2	2	2	2	2	2	3	2	2	2	2	72%	36%
Sem 1	2010	CB2010(7-4-10)_14(32x).jpg	-	163.0	female	4	2	2	3	2	2	1	-	1	3	4	2	2	3	3	3	2	1	3	4	2	39%	38%
Sem 2	2010	CB2010(7-9-10)_27(40x).jpg	-	119.0	undefined	9	0	1	1	1	0	2	-	0	1	2	2	1	1	1	1	3	1	2	3	1	50%	70%
Sem 2	2010	CB2010(30-9-10)_2(32x).jpg	-	125.0	undefined	9	1	3	2	1	1	2	-	1	-	2	2	1	1	2	1	3	1	2	3	1	47%	45%
Sem 2	2010	CB2010(30-9-10)_16(32x).jpg	-	144.0	female	9	1	2	-1	2	1	2	-	1	2	3	2	1	1	2	1	4	1	3	4	1	39%	68%
Sem 2	2010	CB2010(7-9-10)_34(32x).jpg	-	146.0	undefined	9	1	2	2	2	2	2	-	1	3	3	2	2	2	2	1	3	2	3	4	2	56%	36%
Sem 2	2010	CB2010(30-9-10)_7(32x).jpg	-	138.0	female	9	2	2	1	1	1	2	-	1	2	2	2	2	2	2	1	3	2	2	3	2	61%	34%
Sem 2	2010	CB2010(30-9-10)_18(32x).jpg	-	145.0	undefined	9	1	-	2	2	2	2	-	1	2	3	2	2	2	2	2	3	2	3	4	2	65%	33%
Sem 2	2010	CB2010(30-9-10)_26(32x).jpg	-	141.0	female	9	2	2	2	2	1	2	-	1	2	3	3	2	2	2	2	4	2	2	4	2	67%	36%
Sem 2	2010	CB2010(30-9-10)_34(25x).jpg	-	151.0	female	9	2	3	1	3	2	2	-	1	2	4	3	2	2	2	1	3	2	2	4	2	50%	39%
Sem 2	2010	CB2010(14-9-10)_21(32x).jpg	-	142.0	male	9	1	2	2	3	2	2	-	2	2	3	2	1	2	3	1	3	2	2	3	2	56%	32%
Sem 2	2010	CB2010(22-9-10)_6(32x).jpg	-	125.0	undefined	9	0	1	1	2	1	2	-	1	2	2	2	1	1	1	1	3	1	2	2	1	50%	49%
Sem 2	2010	CB2010(22-9-10)_13(32x).jpg	-	115.0	undefined	9	0	1	1	1	1	2	-	1	1	2	2	1	1	1	1	2	1	2	2	1	61%	45%
Sem 2	2010	CB2010(22-9-10)_15(32x).jpg	-	128.0	undefined	9	0	1	1	1	1	2	-	1	1	2	2	1	1	1	1	3	1	2	3	1	61%	56%
Sem 2	2010	CB2010(22-9-10)_20(32x).jpg	-	116.0	undefined	9	1	1	1	2	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2010	CB2010(22-9-10)_27(32x).jpg	-	131.0	undefined	9	-	1	1	2	1	2	-	1	1	2	2	1	1	1	1	2	1	2	2	1	59%	36%
Sem 2	2010	CB2010(27-9-10)_1(32x)C.2.jpg	-	115.0	undefined	9	0	1	0	1	0	1	-	0	1	1	1	1	1	1	-	1	0	1	2	1	65%	74%
Sem 2	2010	CB2010(27-9-10)_5(32x)C.2.jpg	-	130.0	undefined	9	1	2	2	2	1	2	-	1	2	3	2	1	1	2	1	2	2	2	3	2	56%	36%
Sem 2	2010	CB2010(27-9-10)_6(32x)C.2.jpg	-	125.0	undefined	9	1	1	1	1	1	2	-	1	1	2	2	1	1	1	1	3	1	3	3	1	67%	52%
Sem 2	2010	CB2010(27-9-10)_11(32x)C.2.jpg	-	133.0	undefined	9	2	2	1	1	1	2	-	1	2	2	2	1	1	2	1	3	1	2	3	2	44%	41%
Sem 2	2010	CB2010(27-9-10)_13(32x)C.2.jpg	-	121.0	undefined	9	2	2	1	1	1	2	-	1	1	2	2	1	1	1	1	2	1	3	3	1	56%	45%
Sem 2	2010	CB2010(27-9-10)_15(32x)C.2.jpg	-	121.0	undefined	9	1	2	2	1	1	2	-	1	2	2	2	1	1	1	1	3	1	2	3	1	50%	43%
Sem 2	2010	CB2010(27-9-10)_33(32x)C.1.jpg	-	147.0	female	9	2	3	2	2	2	3	-	1	2	3	3	1	1	2	2	3	2	3	4	2	44%	36%
Sem 2	2010	CB2010(27-9-10)_20(32x)C.1.jpg	-	140.0	undefined	9	1	2	1	1	1	2	-	1	2	3	2	1	1	1	1	3	1	3	3	1	56%	50%
Sem 2	2010	CB2010(28-9-10)_14(32x).jpg	-	117.0	undefined	9	1	2	1	1	1	2	-	1	1	2	2	1	1	1	1	3	1	2	3	1	61%	47%
Sem 2	2010	CB2010(6-9-10)_1(32x).jpg	-	147.0	male	9	1	2	1	3	1	2	-	1	3	3	2	2	2	3	1	3	2	2	4	2	39%	43%
Sem 2	2010	CB2010(6-9-10)_2(32x).jpg	-	146.0	male	9	1	2	1	2	1	2	-	1	3	3	2	2	2	2	1	3	1	4	4	2	39%	49%
Sem 2	2010	CB2010(6-9-10)_10(25x).jpg	-	154.0	female	9	1	2	2	2	2	2	-	1	3	5	2	2	2	2	1	4	2	3	4	2	56%	46%
Sem 2	2010	CB2010(6-9-10)_26(32x).jpg	-	162.0	female	9	2	3	2	3	2	3	-	2	4	4	3	2	2	3	-	4	2	3	5	2	41%	32%
Sem 2	2010	CB2010(6-9-10)_31(32x).jpg	-	144.0	male	9	1	1	1	2	2	2	-	1	3	3	2	2	2	2	2	3	2	3	4	2	50%	39%
Sem 2	2010	CB2010(14-9-10)_5(32x).jpg	-	157.0	male	9	3	2	2	2	3	2	-	3	-	3	3	2	2	3	2	3	2	3	3	3	53%	20%
Sem 2	2010	CB2010(14-9-10)_13(25x).jpg	-	165.0	female	9	2	3	3	3	3	2	-	2	4	3	2	2	2	3	2	3	2	3	4	2	44%	26%
Sem 2	2010	CB2010(14-9-10)_24(25x).jpg	-	174.0	male	9	2	2	1	3	3	3	-	2	4	4	3	2	2	3	1	3	2	4	4	2	33%	36%
Sem 2	2010	CB2010(14-9-10)_33(25x).jpg	-	171.0	female	9	0	3	1	3	2	3	-	2	3	4	3	2	2	3	2	3	2	3	4	3	44%	39%
Sem 2	2010	CB2010(14-9-10)_25(32x).jpg	-	150.0	male	9	1	2	1	2	2	2	-	1	3	3	2	2	2	2	1	3	2	3	3	2	50%	35%
Sem 2	2010	CB2010(14-9-10)_9(32x).jpg	-	164.0	female	9	1	2	1	3	2	2	-	1	4	4	2	2	3	3	1	3	2	3	4	2	33%	43%
					Total read		63	65	66	66	66	66	0	66	64	66	66	66	66	66	64	66	66	66	66		**58.5%**	**78.7%**
					Total NOT read		3	1	0	0	0	0	66	0	2	0	0	0	0	0	2	0	0	0	0			

ANE_GSA19- Western Ionian

Table 1 **Anchovy Otolith SET GSA19-Western Ionian (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15		
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	MODAL age	Percent agreement	Precision CV
Sem 1	2012	GSA19_33.jpg	-	125.0	M	5	2	1	2	1	0	0	-	1	0	1	0	1	1	1	1	1	1	1	1	1	67%	66%
Sem 1	2012	GSA19_34.jpg	-	125.0	F	5	0	1	2	1	0	1	-	0	1	1	1	1	1	1	2	1	1	1	1	1	72%	57%
Sem 1	2012	GSA19_35.jpg	-	130.0	F	5	2	1	2	1	1	1	-	1	1	1	1	1	1	1	1	1	1	2	1	1	83%	33%
Sem 1	2012	GSA19_36.jpg	-	130.0	M	5	2	-	2	1	1	1	-	1	1	2	1	1	1	2	3	2	2	2	2	2	47%	39%
Sem 1	2012	GSA19_37.jpg	-	135.0	F	5	2	2	2	2	1	1	-	1	1	2	1	1	1	2	2	2	1	1	2	2	50%	34%
Sem 1	2012	GSA19_38.jpg	-	135.0	M	5	2	2	2	1	0	1	-	0	1	1	0	1	2	1	2	1	1	1	1	1	56%	61%
Sem 1	2012	GSA19_39.jpg	-	140.0	F	5	1	1	2	2	1	1	-	1	1	1	1	1	2	1	2	1	1	2	2	1	67%	36%
Sem 1	2012	GSA19_40.jpg	-	140.0	M	5	1	1	2	2	1	1	-	0	2	2	2	2	2	2	2	2	2	2	2	2	72%	36%
Sem 1	2012	GSA19_41.jpg	-	145.0	F	5	1	1	2	2	1	1	-	0	2	2	1	2	2	2	2	2	2	2	2	2	67%	38%
Sem 1	2012	GSA19_42.jpg	-	100.0	M	4	0	1	2	1	0	1	-	0	0	0	1	1	1	1	1	2	1	1	1	1	61%	74%
Sem 1	2012	GSA19_43.jpg	-	105.0	F	4	0	1	2	1	0	1	-	0	0	0	1	1	1	1	1	2	1	1	1	1	61%	74%
Sem 1	2012	GSA19_44.jpg	-	105.0	M	4	0	1	1	1	0	0	-	0	0	0	0	1	1	1	1	1	1	0	1	1	56%	92%
Sem 1	2012	GSA19_45.jpg	-	110.0	M	4	0	1	1	0	0	1	-	0	0	0	1	1	1	1	1	1	1	1	1	1	67%	73%
Sem 1	2012	GSA19_46.jpg	-	110.0	F	4	0	1	2	0	0	1	-	0	0	0	1	1	1	1	1	1	1	0	1	1	56%	89%
Sem 1	2012	GSA19_47.jpg	-	115.0	F	4	0	1	1	0	0	1	-	0	0	0	1	1	1	1	1	1	1	1	1	1	67%	73%
Sem 1	2012	GSA19_48.jpg	-	115.0	M	4	0	1	2	0	0	1	-	0	1	1	1	1	1	1	1	0	1	0	1	1	61%	80%
Sem 1	2012	GSA19_49.jpg	-	120.0	F	4	1	1	3	1	1	1	-	0	2	1	1	1	2	2	2	2	1	2	2	1	50%	49%
Sem 1	2012	GSA19_50.jpg	-	120.0	M	4	1	1	2	1	0	1	-	1	1	1	1	1	2	1	2	2	1	1	2	1	67%	45%
Sem 1	2012	GSA19_51.jpg	-	100.0	F	4	-	1	1	0	0	1	-	0	0	0	1	1	1	1	1	1	1	0	1	1	65%	76%
Sem 1	2012	GSA19_52.jpg	-	135.0	F	5	0	1	1	1	1	1	-	0	1	1	1	1	1	1	2	1	1	2	2	1	72%	51%
Sem 1	2012	GSA19_53.jpg	-	130.0	F	5	0	1	1	1	1	1	-	0	1	1	1	2	2	1	2	1	1	1	2	1	67%	52%
Sem 1	2012	GSA19_54.jpg	-	130.0	M	5	0	1	1	1	1	1	-	0	1	1	1	1	1	1	2	1	1	1	2	1	78%	49%
Sem 1	2012	GSA19_55.jpg	-	125.0	F	5	0	1	1	1	1	1	-	0	1	1	1	1	1	1	2	1	1	0	1	1	78%	53%
Sem 1	2012	GSA19_56.jpg	-	125.0	M	5	0	1	1	1	1	1	-	0	1	1	1	1	1	1	2	2	1	2	1	1	72%	51%
Sem 1	2012	GSA19_57.jpg	-	100.0	F	5	1	1	1	0	0	0	-	0	0	0	0	0	0	0	1	1	0	0	1	0	67%	146%
Sem 2	2013	GSA19_01.jpg	-	110.0	M	8	1	2	2	2	1	2	-	1	2	2	2	2	1	2	1	3	1	3	2	2	56%	36%
Sem 2	2013	GSA19_02.jpg	-	110.0	F	8	0	2	1	2	1	2	-	1	2	2	2	2	1	1	1	2	1	1	2	2	50%	43%
Sem 2	2013	GSA19_03.jpg	-	115.0	F	8	1	2	1	2	1	2	-	1	2	2	2	1	1	2	1	3	1	3	3	1	44%	44%
Sem 2	2013	GSA19_04.jpg	-	135.0	M	8	2	2	1	2	1	2	-	1	2	3	2	2	2	2	1	2	1	2	3	2	61%	34%
Sem 2	2013	GSA19_05.jpg	-	140.0	M	8	1	2	1	2	1	2	-	1	2	2	2	2	2	2	1	2	1	2	2	2	67%	29%
Sem 2	2013	GSA19_07.jpg	-	105.0	F	8	1	2	1	2	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	61%	36%
Sem 2	2013	GSA19_08.jpg	-	80.0	U	9	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	1	0	0	61%	129%
Sem 2	2013	GSA19_09.jpg	-	80.0	U	9	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	0	0	67%	146%
Sem 2	2013	GSA19_10.jpg	-	85.0	U	9	0	1	0	0	0	1	-	1	0	1	1	0	0	0	0	1	0	0	0	0	67%	146%
Sem 2	2013	GSA19_11.jpg	-	85.0	U	9	0	1	0	0	0	1	-	1	0	0	1	0	0	0	0	1	0	0	0	0	72%	166%
Sem 2	2013	GSA19_12.jpg	-	90.0	F	9	0	1	0	0	0	1	-	1	0	1	1	1	0	0	0	1	0	0	1	0	56%	115%
Sem 2	2013	GSA19_13.jpg	-	90.0	M	9	0	1	0	1	0	1	-	1	-	1	1	1	1	1	0	1	0	1	1	1	71%	67%
Sem 2	2013	GSA19_14.jpg	-	95.0	M	9	0	1	0	1	0	1	-	1	-	1	1	1	1	0	0	1	0	0	1	1	59%	86%
Sem 2	2013	GSA19_15.jpg	-	95.0	F	9	0	1	0	1	0	1	-	1	-	1	1	1	1	0	0	1	0	1	1	1	65%	76%
Sem 2	2013	GSA19_17.jpg	-	100.0	M	9	1	1	1	1	1	2	-	1	1	2	2	1	1	1	0	1	1	1	2	1	72%	44%
Sem 2	2013	GSA19_18.jpg	-	105.0	M	9	0	1	0	2	1	1	-	1	1	2	1	1	1	1	0	1	1	1	2	1	67%	59%
Sem 2	2013	GSA19_19.jpg	-	105.0	F	9	1	2	1	2	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	67%	36%
Sem 2	2012	GSA19_21.jpg	-	120.0	F	9	1	2	1	2	1	2	-	1	1	2	2	1	1	1	1	2	1	1	3	1	61%	43%
Sem 2	2012	GSA19_22.jpg	-	120.0	M	9	2	2	2	1	1	3	-	1	2	2	3	1	1	2	2	3	2	2	3	2	50%	37%
Sem 2	2012	GSA19_23.jpg	-	125.0	F	9	0	2	0	1	1	2	-	1	1	2	2	1	1	1	1	3	1	1	3	1	56%	63%
Sem 2	2012	GSA19_24.jpg	-	125.0	M	9	1	2	1	2	1	2	-	1	2	2	3	2	2	2	1	3	2	2	3	2	56%	36%
Sem 2	2012	GSA19_26.jpg	-	140.0	F	9	1	2	1	2	1	2	-	1	2	3	3	2	2	2	1	3	2	2	3	2	50%	37%
Sem 2	2012	GSA19_31.jpg	-	140.0	F	9	0	2	1	2	1	2	-	1	1	2	2	1	2	2	1	2	2	1	2	2	50%	43%
Sem 2	2012	GSA19_32.jpg	-	130.0	F	9	1	2	1	2	1	2	-	1	1	2	2	2	2	2	1	2	1	2	2	2	61%	31%
Sem 2	2012	GSA19_16.jpg	-	100.0	F	9	1	1	1	1	1	2	-	1	1	2	2	1	1	1	0	2	1	1	2	1	67%	45%
Sem 2	2012	GSA19_20.jpg	-	110.0	F	9	1	2	1	2	1	2	-	1	1	2	2	1	1	1	1	2	1	1	2	1	61%	36%
Sem 2	2012	GSA19_28.jpg	-	135.0	F	9	1	1	1	2	1	2	-	1	1	2	2	2	2	2	1	3	2	2	3	2	50%	39%
Sem 2	2012	GSA19_29.jpg	-	140.0	F	9	1	2	1	2	1	2	-	1	2	2	2	2	2	2	1	3	2	2	3	2	61%	34%
Sem 2	2012	GSA19_30.jpg	-	145.0	F	9	0	2	1	2	1	2	-	1	2	3	2	2	2	2	1	3	2	1	3	2	50%	45%
Sem 2	2011	GSA19_60.jpg	-	130.0	M	9	1	2	1	2	1	2	-	0	1	2	2	2	2	2	1	2	1	1	2	2	50%	43%
					Total read		54	54	55	55	55	55	0	55	52	55	55	55	55	55	55	55	55	55	55		**61.9%**	**60.9%**
					Total NOT read		1	1	0	0	0	0	55	0	3	0	0	0	0	0	0	0	0	0	0			

ANE_GSA22- Aegean Sea

Table 1 **Anchovy Otolith SET GSA22- Aegean Sea (Anchovy Exchange 2014)**

	Sample		Fish	Fish		Landing	Sp AU	Sp IR	Fr PG	It SG	Sp PT	Sp CD	Sp CN	Sp JT	It PC	It LC	Sp AA	It SM	It MP	Gr CM	Fr EB	Po ES	Gr DP	Sl TM	It PG	RANGE r. 1-15 MODAL	Percent	Precision
Stratum	year	no	no	length	Sex	month	Reader 1	Reader 2	Reader 3	Reader 4	Reader 5	Reader 6	Reader 7	Reader 8	Reader 9	Reader 10	Reader 11	Reader 12	Reader 13	Reader 14	Reader 15	Reader 16	Reader 17	Reader 18	Reader 19	age	agreement	CV
Sem 1	2014	ANE20062014_1_01.jpg		97.0	female	6	1	1	1	0	1	1	-	1	1	0	1	1	0	0	1	1	0	1	0	1	67%	73%
Sem 1	2014	ANE20062014_1_03.jpg		94.0	male	6	1	1	1	1	1	1	-	1	1	0	1	1	0	1	1	1	0	1	0	1	78%	55%
Sem 1	2014	ANE20062014_1_05.jpg		100.0	female	6	1	1	1	1	1	1	-	1	1	0	1	1	1	1	1	1	1	1	0	1	89%	36%
Sem 1	2014	ANE20062014_1_08.jpg		97.0	male	6	1	1	1	1	1	1	-	1	1	0	1	1	0	0	1	1	0	1	0	1	72%	64%
Sem 1	2014	ANE20062014_1_10.jpg		105.0	female	6	1	1	1	1	1	1	-	1	1	0	1	1	1	1	1	1	1	1	1	1	94%	25%
Sem 1	2014	ANE20062014_1_13.jpg		93.0	female	6	1	1	1	0	0	1	-	1	1	0	1	0	0	0	1	1	0	1	1	1	61%	82%
Sem 1	2014	ANE20062014_1_15.jpg		99.0	male	6	1	1	1	1	1	1	-	1	1	0	1	0	0	0	1	1	0	1	1	1	72%	64%
Sem 1	2014	ANE20062014_1_17.jpg		95.0	male	6	1	1	1	1	1	1	-	1	1	0	1	0	0	1	1	1	0	1	0	1	72%	64%
Sem 1	2014	ANE20062014_1_18.jpg		105.0	male	6	1	1	1	0	1	1	-	1	1	0	1	1	1	0	1	1	0	0	1	1	72%	64%
Sem 1	2014	ANE20062014_1_19.jpg		99.0	female	6	1	1	1	0	1	1	-	1	1	0	1	1	0	0	1	1	0	0	0	1	61%	82%
Sem 1	2014	ANE20062014_1_20.jpg		95.0	female	6	1	1	1	1	1	1	-	1	1	1	1	0	0	1	1	2	1	1	1	1	83%	44%
Sem 1	2014	ANE20062014_1_21.jpg		94.0	male	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	1	0	1	61%	82%
Sem 1	2014	ANE20062014_1_23.jpg		95.0	male	6	1	1	1	0	1	1	-	1	1	0	1	1	0	0	1	1	0	1	0	1	67%	73%
Sem 1	2014	ANE20062014_1_24.jpg		97.0	female	6	2	1	2	1	1	1	-	1	1	1	1	1	1	1	1	1	0	1	1	1	83%	39%
Sem 1	2014	ANE20062014_1_26.jpg		95.0	female	6	1	1	1	0	1	1	-	1	-	0	1	1	0	0	1	1	0	0	1	1	65%	76%
Sem 1	2014	ANE20062014_1_29.jpg		89.0	male	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	1	56%	92%
Sem 1	2014	ANE20062014_1_30.jpg		97.0	male	6	1	1	1	1	1	1	-	1	1	1	1	1	0	1	1	1	1	0	1	1	89%	36%
Sem 1	2014	ANE20062014_1_31.jpg		94.0	male	6	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	0	1	1	94%	25%
Sem 1	2014	ANE20062014_1_32.jpg		101.0	female	6	1	1	1	1	1	1	-	1	1	0	1	1	1	1	1	1	1	0	1	1	89%	36%
Sem 1	2014	ANE20062014_1_33.jpg		83.0	female	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	1	56%	92%
Sem 1	2014	ANE20062014_1_34.jpg		87.0	male	6	0	1	0	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	0	56%	115%
Sem 1	2014	ANE20062014_1_35.jpg		91.0	male	6	1	1	1	0	1	1	-	1	1	1	1	1	1	0	1	1	0	0	0	1	72%	64%
Sem 1	2014	ANE20062014_1_36.jpg		93.0	male	6	1	1	1	0	1	1	-	1	1	1	1	0	1	0	1	1	0	1	1	1	78%	55%
Sem 1	2014	ANE20062014_1_37.jpg		106.0	male	6	1	1	0	0	1	1	-	1	1	0	1	1	1	0	1	1	0	0	0	1	61%	82%
Sem 1	2014	ANE20062014_1_38.jpg		101.0	female	6	0	1	0	0	1	1	-	1	1	0	1	1	0	0	1	1	0	0	0	0	50%	103%
Sem 1	2014	ANE20062014_1_39.jpg		84.0	female	6	0	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	0	50%	103%
Sem 1	2014	ANE20062014_1_40.jpg		82.0	male	6	0	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	0	50%	103%
Sem 1	2014	ANE20062014_1_41.jpg		93.0	male	6	1	1	1	1	1	1	-	1	1	0	1	0	1	1	1	2	1	1	1	1	83%	44%
Sem 1	2014	ANE20062014_1_42.jpg		94.0	male	6	1	1	1	0	1	1	-	1	-	0	1	1	1	1	1	1	1	0	1	1	82%	48%
Sem 1	2014	ANE20062014_1_43.jpg		101.0	male	6	1	1	1	0	1	1	-	1	1	0	1	1	1	1	1	1	1	0	1	1	83%	46%
Sem 1	2014	ANE20062014_1_45.jpg		92.0	male	6	1	1	1	0	0	1	-	1	1	0	1	1	1	0	1	1	0	1	1	1	72%	64%
Sem 1	2014	ANE20062014_1_46.jpg		94.0	male	6	1	1	1	1	1	1	-	1	-	0	1	1	1	0	1	1	0	1	1	1	82%	48%
Sem 1	2014	ANE20062014_1_47.jpg		86.0	male	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	1	0	1	61%	82%
Sem 1	2014	ANE20062014_1_48.jpg		88.0	male	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	1	0	1	61%	82%
Sem 1	2014	ANE20062014_1_49.jpg		90.0	male	6	0	1	0	0	1	1	-	1	1	0	1	1	0	0	1	1	0	0	0	0	50%	103%
Sem 1	2014	ANE20062014_1_50.jpg		85.0	female	6	1	1	1	0	1	1	-	1	1	0	1	0	0	0	1	1	0	0	0	1	56%	92%
Sem 2	2014	ANE25092014_4_02.jpg		125.0	male	9	1	2	1	1	1	2	-	2	1	1	2	1	1	1	1	2	1	3	2	1	61%	43%
Sem 2	2014	ANE25092014_4_03.jpg		127.0	female	9	1	2	2	1	2	3	-	1	2	2	2	1	1	2	2	3	1	2	2	2	56%	36%
Sem 2	2014	ANE25092014_4_04.jpg		120.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_05.jpg		119.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_06.jpg		125.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_07.jpg		118.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_08.jpg		126.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_09.jpg		120.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_10.jpg		118.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_11.jpg		119.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_12.jpg		121.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	-	2	1	1	2	1	71%	36%
Sem 2	2014	ANE25092014_4_13.jpg		122.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_14.jpg		117.0	male	9	1	1	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	72%	36%
Sem 2	2014	ANE25092014_4_15.jpg		130.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_16.jpg		131.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_17.jpg		122.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_18.jpg		123.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_19.jpg		130.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_20.jpg		128.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_21.jpg		125.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_22.jpg		124.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_23.jpg		121.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_24.jpg		115.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_25.jpg		122.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_26.jpg		118.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_27.jpg		114.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_28.jpg		126.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_29.jpg		117.0	male	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_30.jpg		125.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_31.jpg		127.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	1	2	1	72%	36%
Sem 2	2014	ANE25092014_4_32.jpg		114.0	male	9	1	2	1	1	1	2	-	1	-	1	2	1	1	1	1	2	1	1	2	1	71%	36%
Sem 2	2014	ANE25092014_4_33.jpg		131.0	female	9	1	2	1	1	1	2	-	1	1	1	2	1	1	1	1	2	1	2	2	1	67%	36%
Sem 2	2014	ANE25092014_4_34.jpg		90.0	male	9	0	1	0	0	0	1	-	1	0	0	1	0	0	0	1	1	0	0	1	0	61%	129%
Sem 2	2014	ANE25092014_4_36.jpg		82.0	male	9	0	1	0	0	0	1	-	1	0	0	1	0	0	0	0	1	0	0	0	0	72%	166%
					Total read		70	70	70	70	70	70	0	70	66	70	70	70	70	70	69	70	70	70	70		**70.0%**	**55.7%**
					Total NOT read		0	0	0	0	0	0	70	0	4	0	0	0	0	0	1	0	0	0	0			

Images of different otoliths with the age annotations

Of all readers by area

(To see the annotations on the otolith images of each reader should zoom the screen)

Images of English Channel (ANE_VII)

Figures 1 to 4

Figure 1. **ANE_VII (English Channel)**: Age Reading for anchovy JC_14_TRIM3_CAMANOC_O_0051.jpg, 9.5 cm, male, caught October 2014, **89% agreement Age 0** (readings. 0-1 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

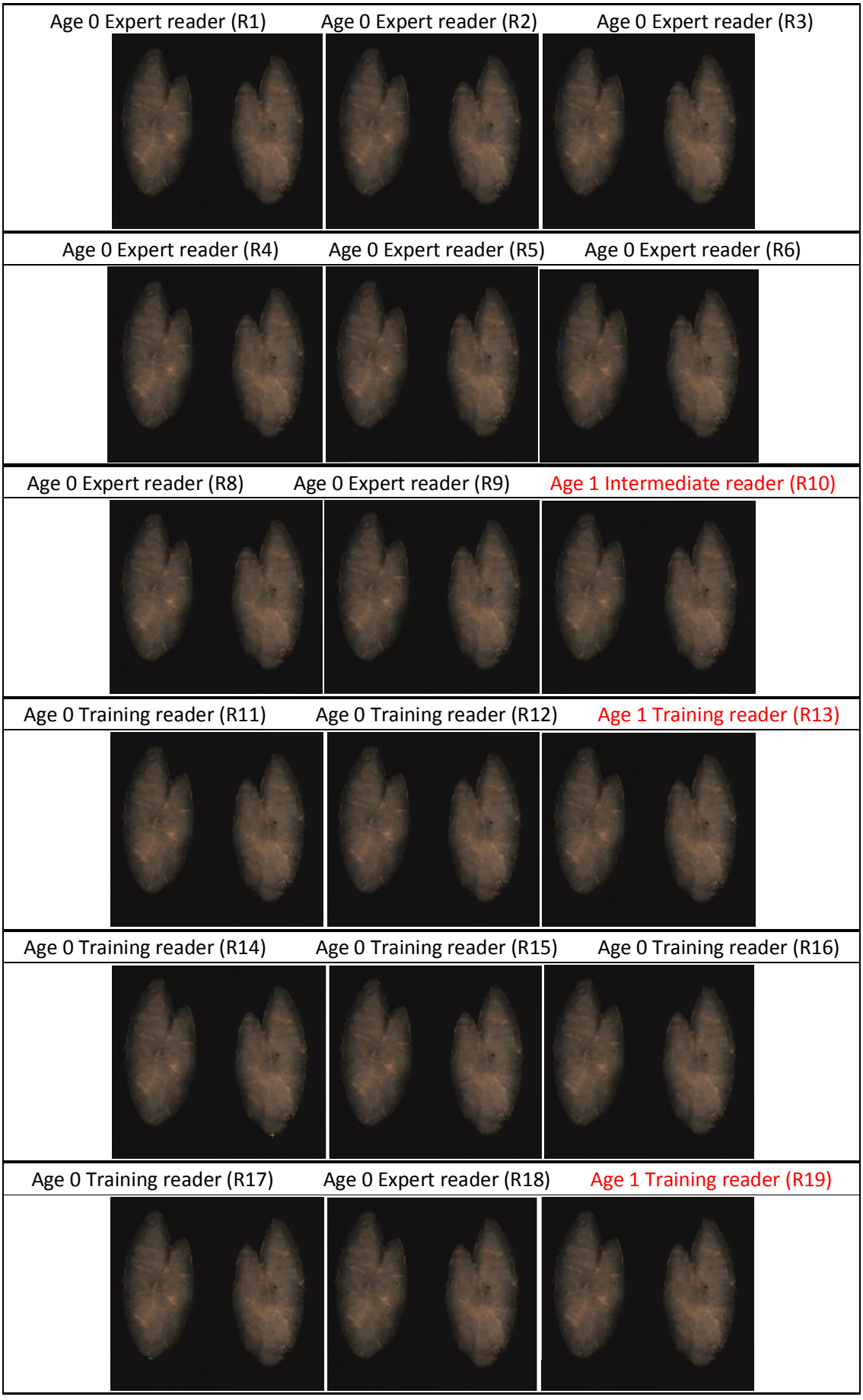


Figure 2. **ANE_VII (English Channel)**: Age Reading for anchovy JC_14_TRIM3_CAMANOC_O_0091.jpg, 13 cm, female, caught in October 2014, **72% agreement Age 0** (readings: 0-2 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

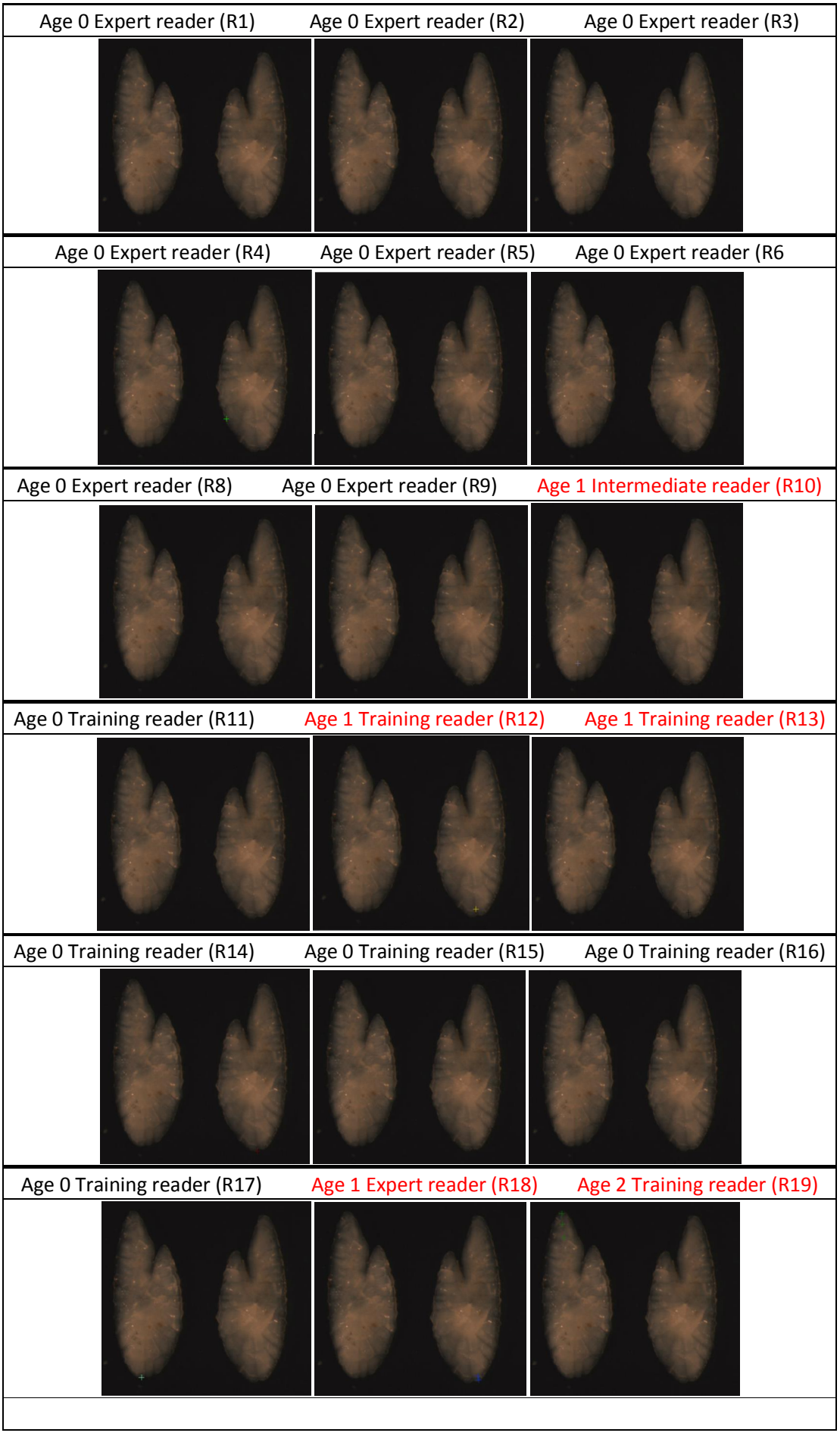


Figure 3. ANE_VII: Age Reading for anchovy JC_14_TRIM3_CAMANOC_O_0005.jpg, 16.5 cm, male, caught September 2014, **44% agreement Age 2** (Readings: 1 to 3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

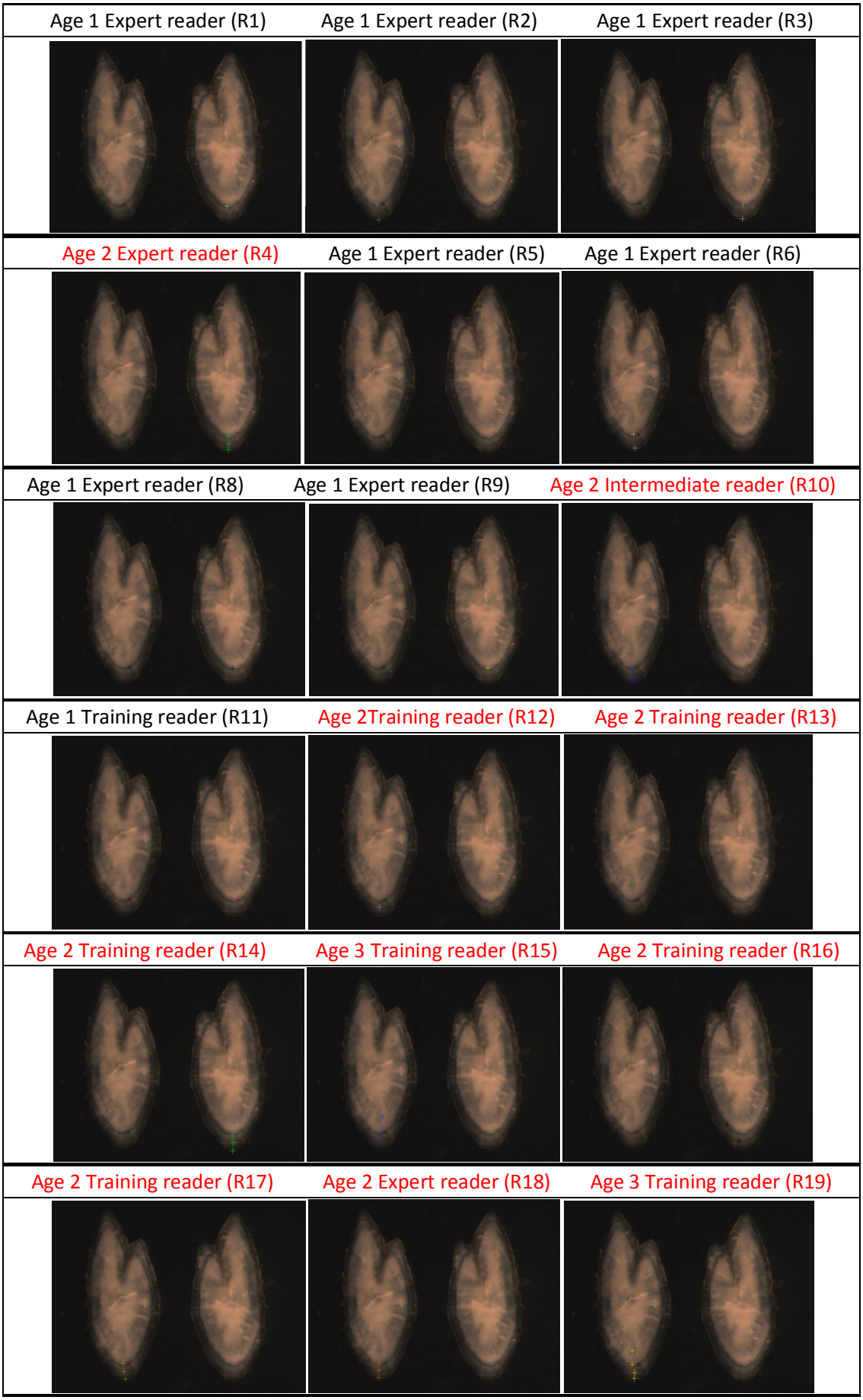
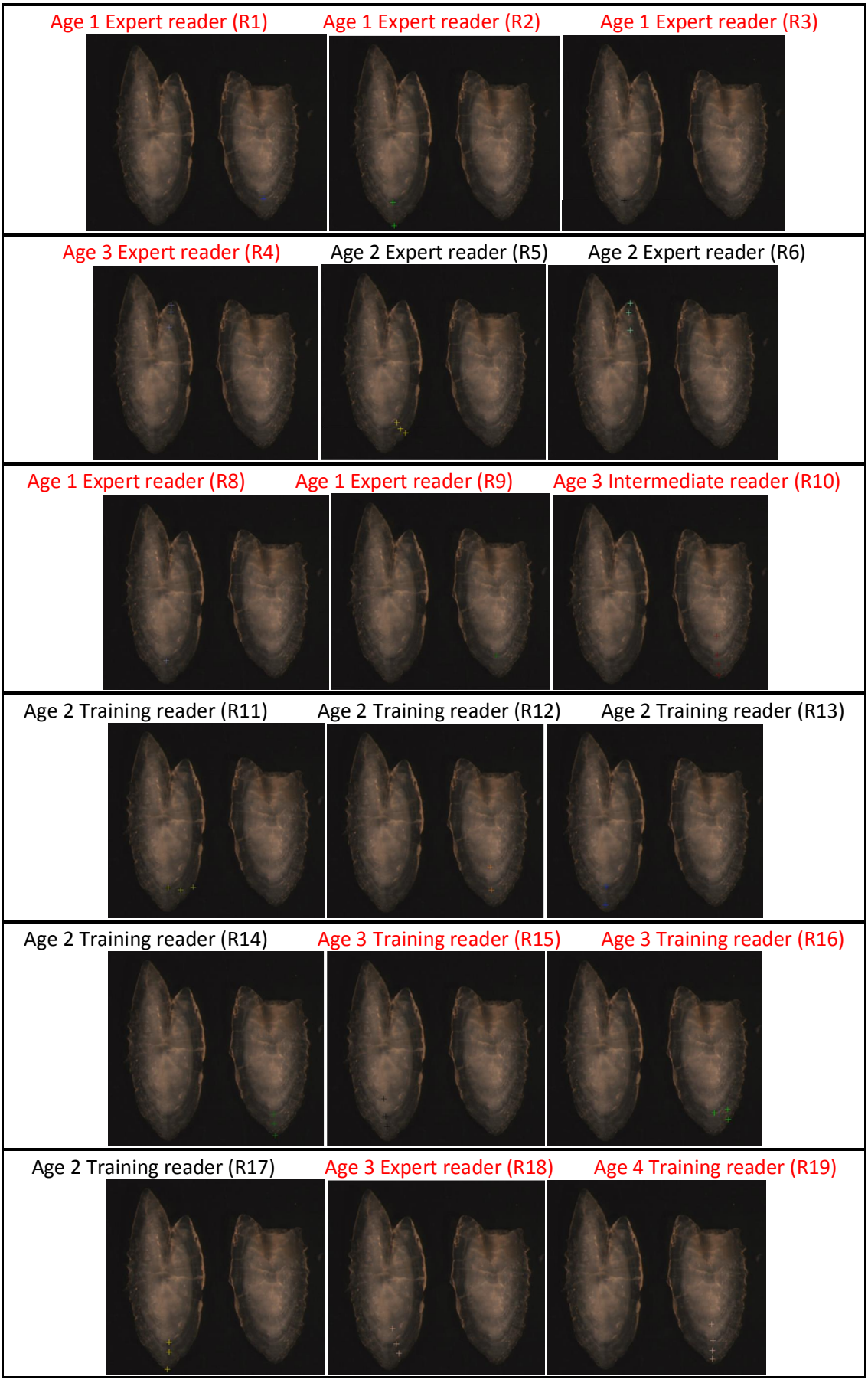


Figure 4. **ANE_VII (English Channel)**: Age Reading for anchovy JC_14_TRIM3_CAMANOC_O_0029.jpg, 18 cm, female, caught in September 2014, **39% agreement Age 2** (readings: 1-4 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age. **Modal age 1 for expert readers** (56% agreement).



Images of Bay of Biscay (ANE_VIII)

Figures 5 to 8

Figure 5. **ANE_VIII (Bay of Biscay)**: Age Reading for anchovy ANE-260913-1_40.jpg, 15.8 cm, male, caught September 2013, **94% agreement Age 2** (readings: 2-3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age

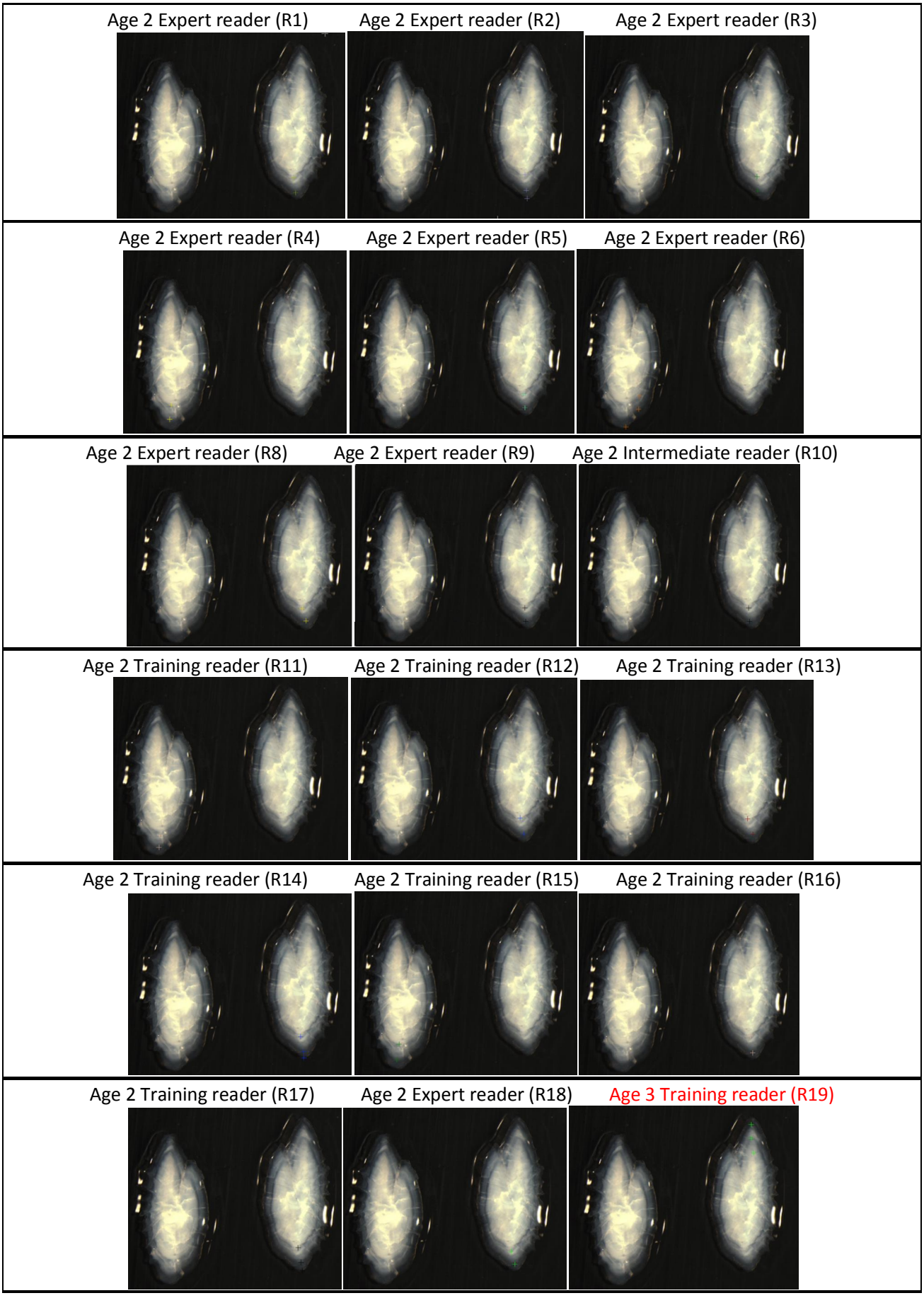


Figure 6. **ANE_VIII (Bay of Biscay)**: Age Reading for anchovy ANE-230413-1_39.jpg, 16.4 cm, female, caught in April 2013, **72% agreement Age 3** (readings: 2-3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

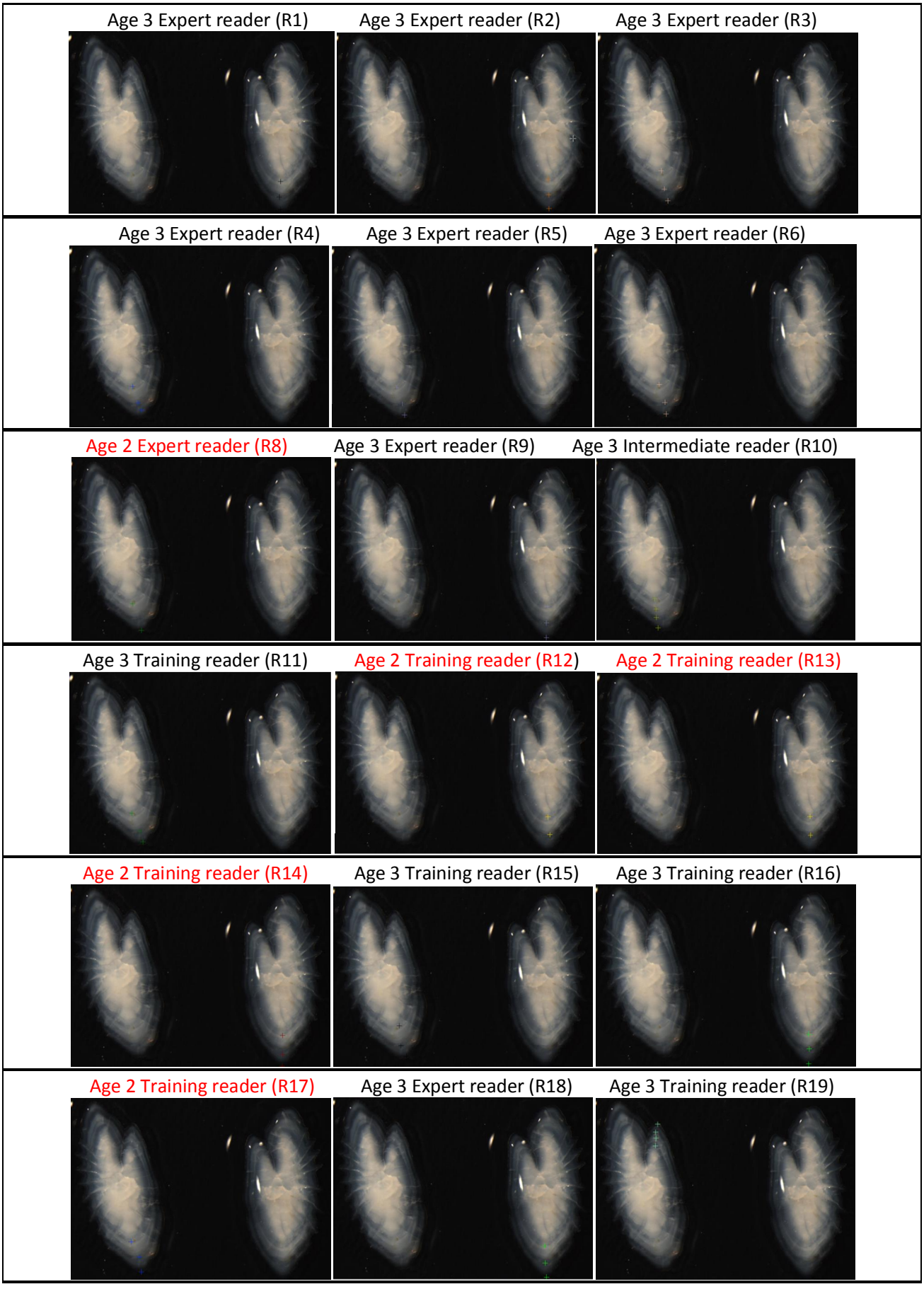


Figure 7. **ANE_VIII (Bay of Biscay)**: Age Reading for anchovy ANE-260913-1_38.jpg, 15.8 cm, undefined sex, caught in September2013, **44% agreement Age 3** (readings: 1-4 years)**.**). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

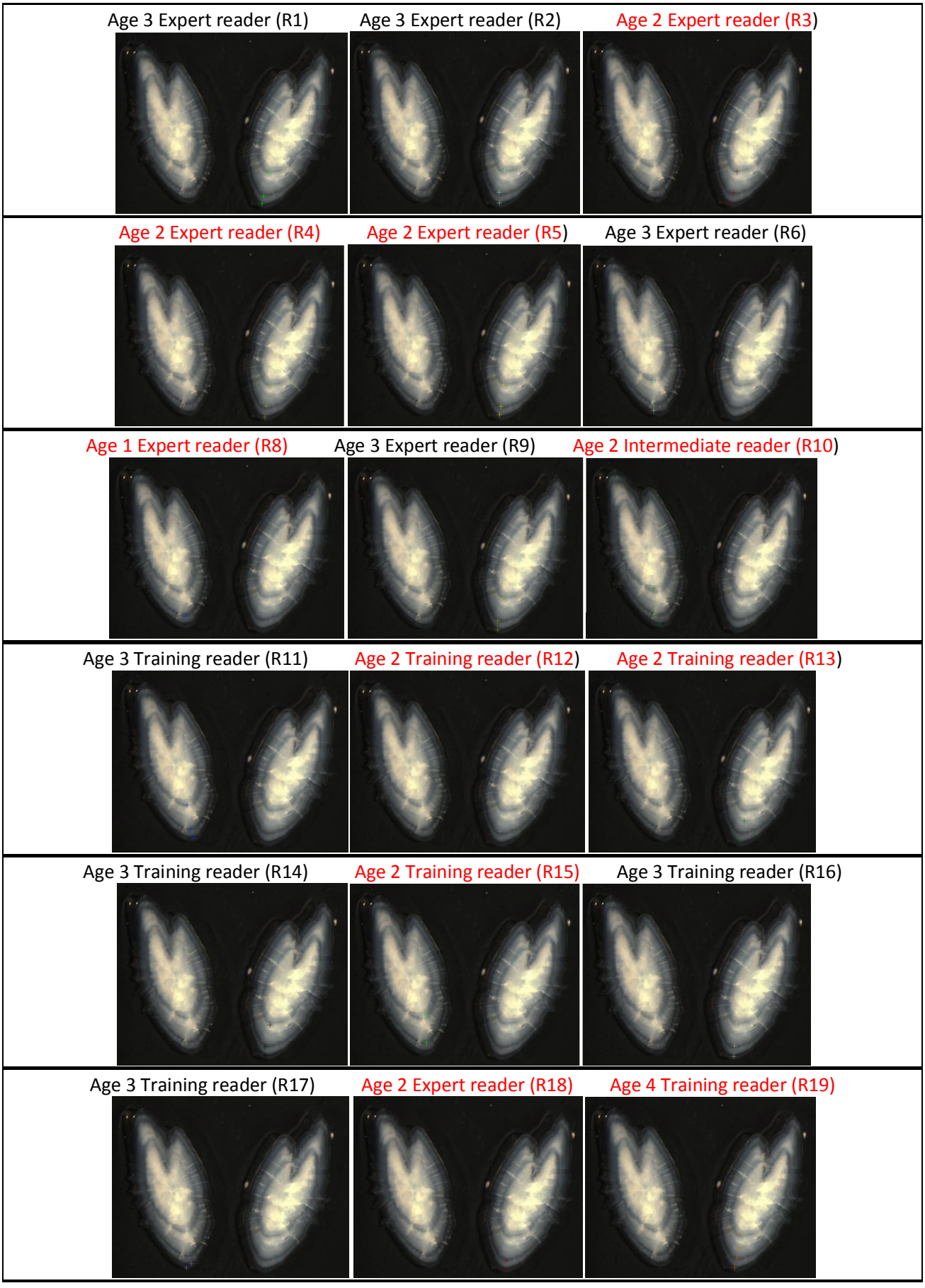
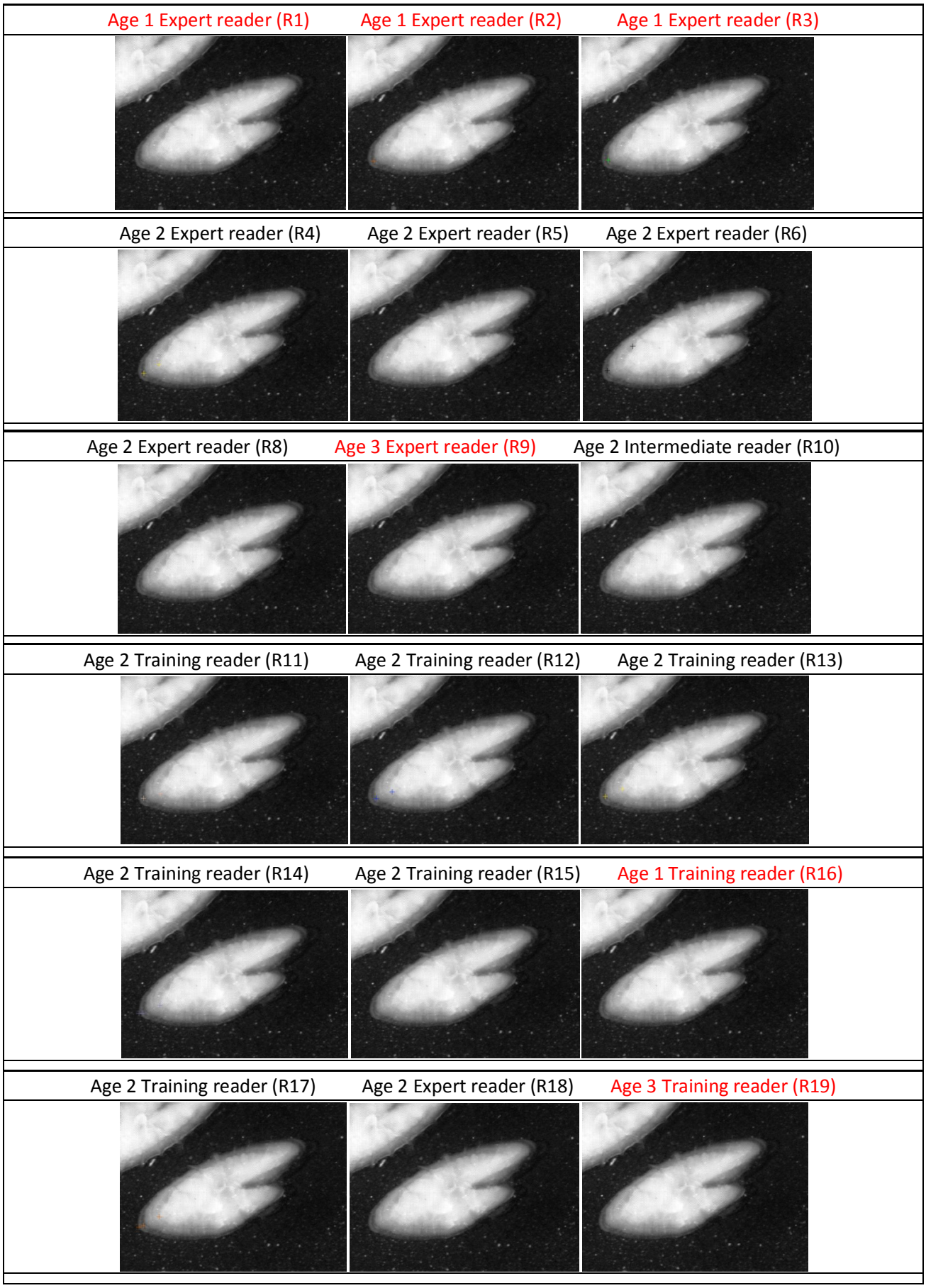


Figure 8. **ANE_VIII (Bay of Biscay)**: Age Reading for anchovy r5020b8.jpg, 15.0 cm, female, caught March 2013, **67% agreement Age 2 (**Readings: 1 -2 years**).** Conventional birthdates: 1st January; in red, readers who do not agree with the modal age**. Modal age 1 for area readers** (50% agreement) and **modal age 2 for expert readers** (56% agreement).



Images of Gulf of Cadiz & Portugal Coast (ANE_IXa)

Figures 9 to 12

Figure 9. **ANE_IXa (Gulf of Cadiz&Portugal Coast):** Age Reading for anchovy OE2014_IXAS_08.jpg, 11.7 cm, female, caught March 2013, **94% agreement Age 1** (Readings: 1-2 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

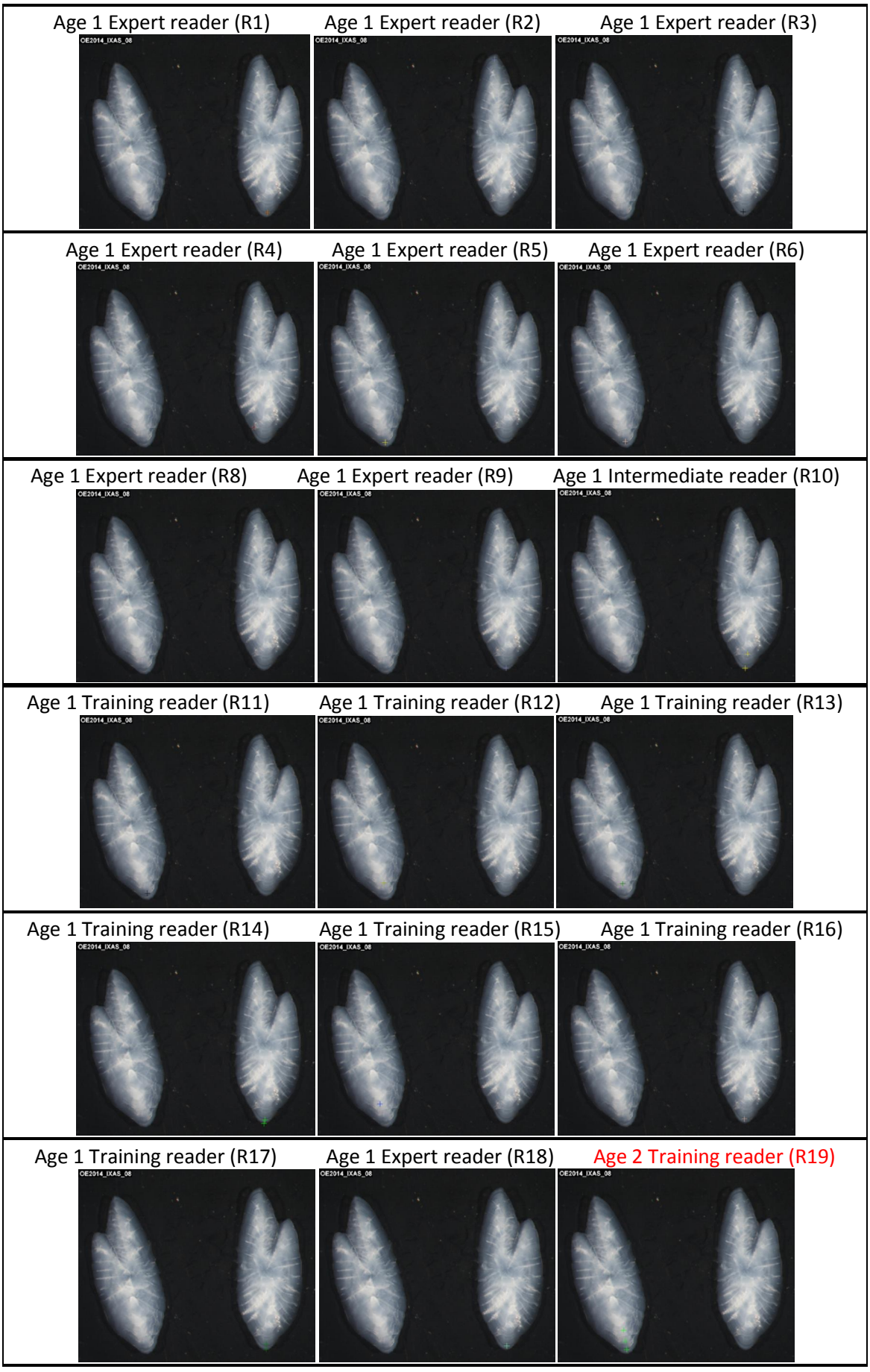


Figure 10. ANE_IXa (Gulf of Cadiz&Portugal Coast): Age Reading for anchovy OE2014_IXAS_48.jpg, 14.5 cm, female, caught August 2013**, 72% agreement Age 2** (Readings: 1 to 4 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

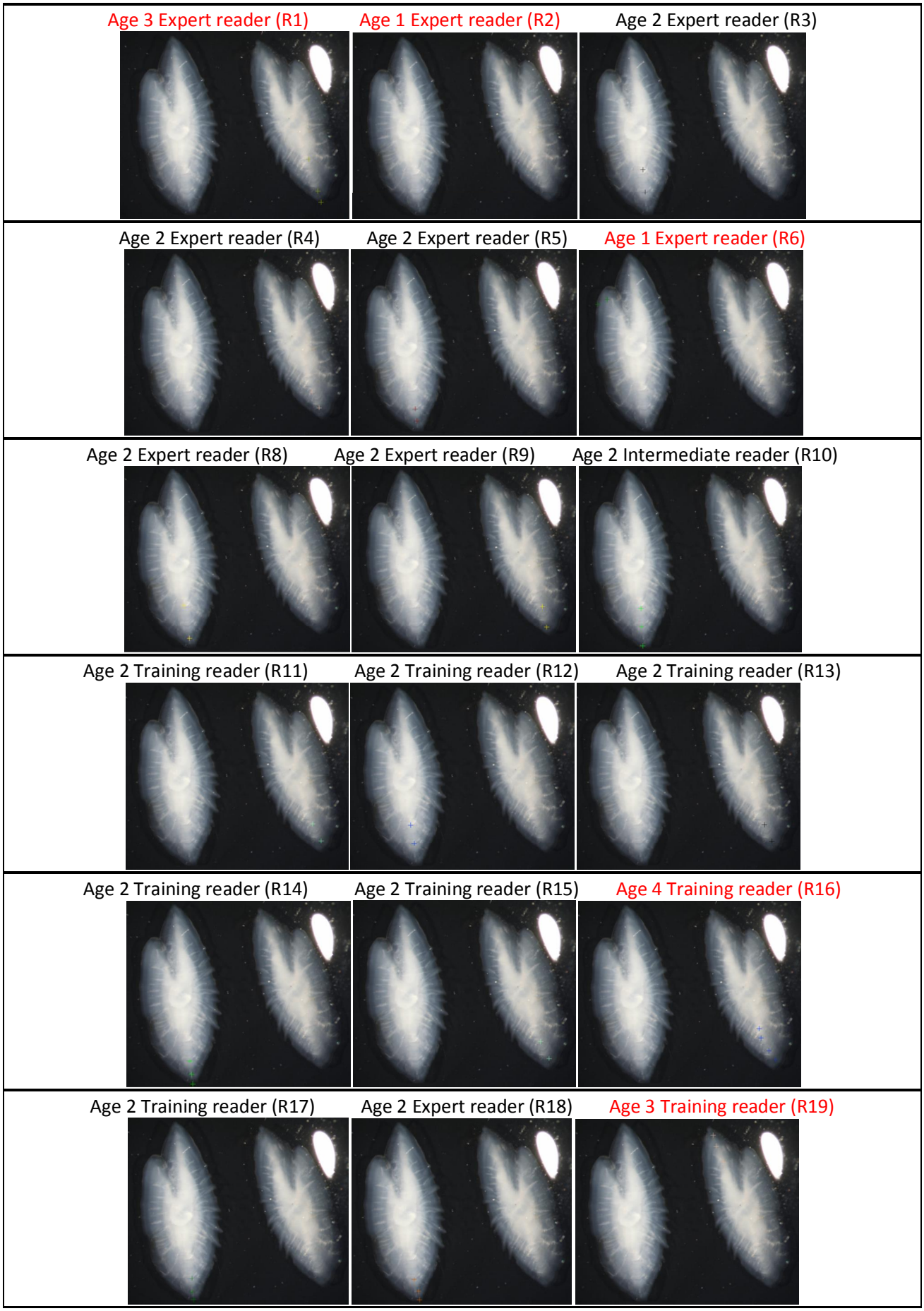


Figure 11. **ANE_IXa (Gulf of Cadiz&Portugal Coast)**: Age Reading for anchovy IPMA_ANEIXaCN_8B.jpg, 16.5 cm, female, caught September 2011, **44% agreement Age 1** (Readings: 1 to 3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

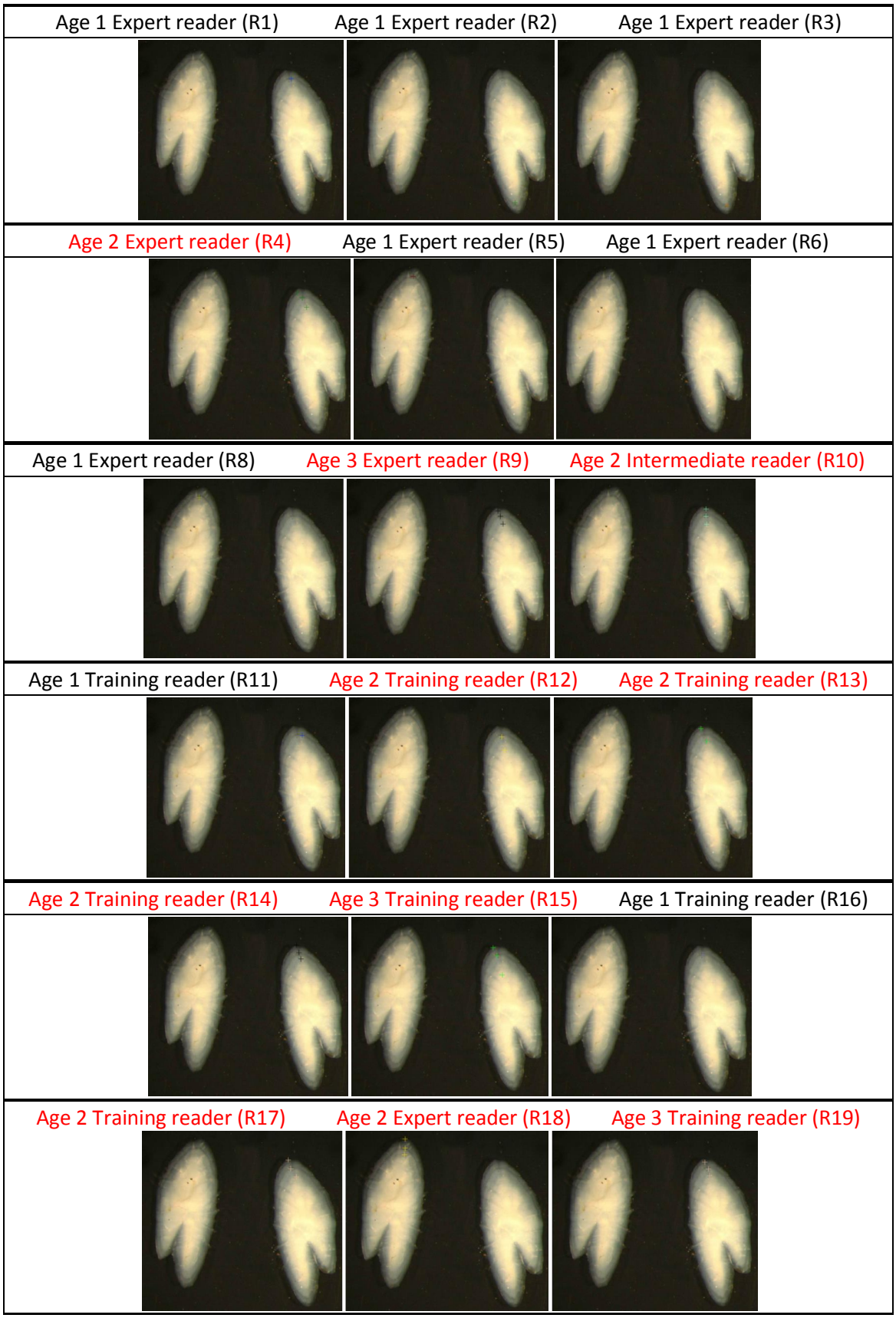
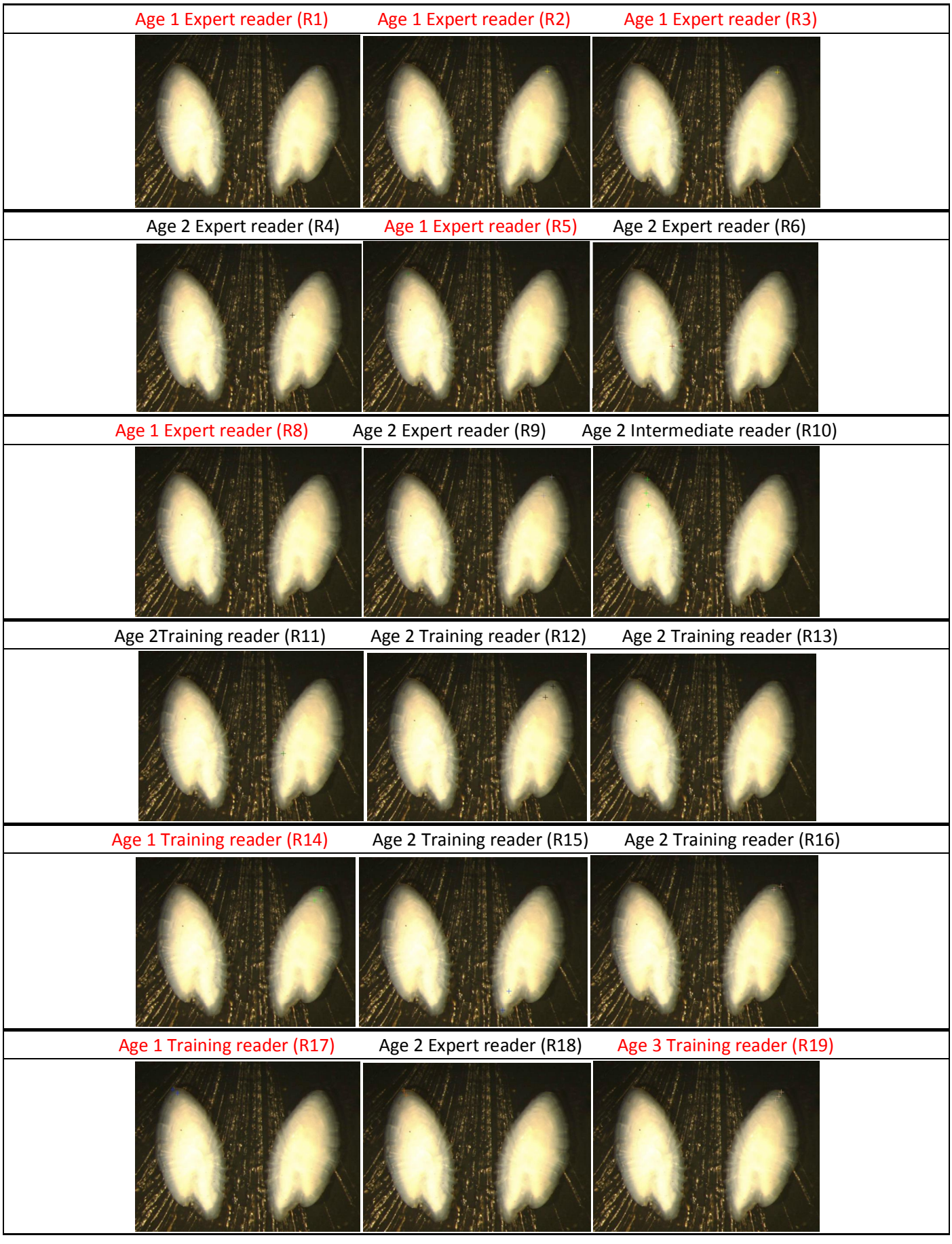


Figure 12. **ANE_IXa (Gulf of Cadiz & Portugal Coast)**: Age Reading for anchovy IPMA_ANEIXaCN_7A.jpg, 14.5 cm, female, caught May 2013, **56% agreement Age 2 (**Readings: 1 to 3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age. **Modal age 2 for area readers** (67% agreement**) and modal age 1 for expert readers** (56% agreement).



Images of Alboran Sea (ANE_GSA01)

Figures 13 to 16

Figure 13. **ANE_GSA01 (Alboran Sea)**: Age Reading for anchovy 08082013-031.jpg, 11.3 cm, male, caught August 2013, **88% agreement Age 1** (Readings: 1-2 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

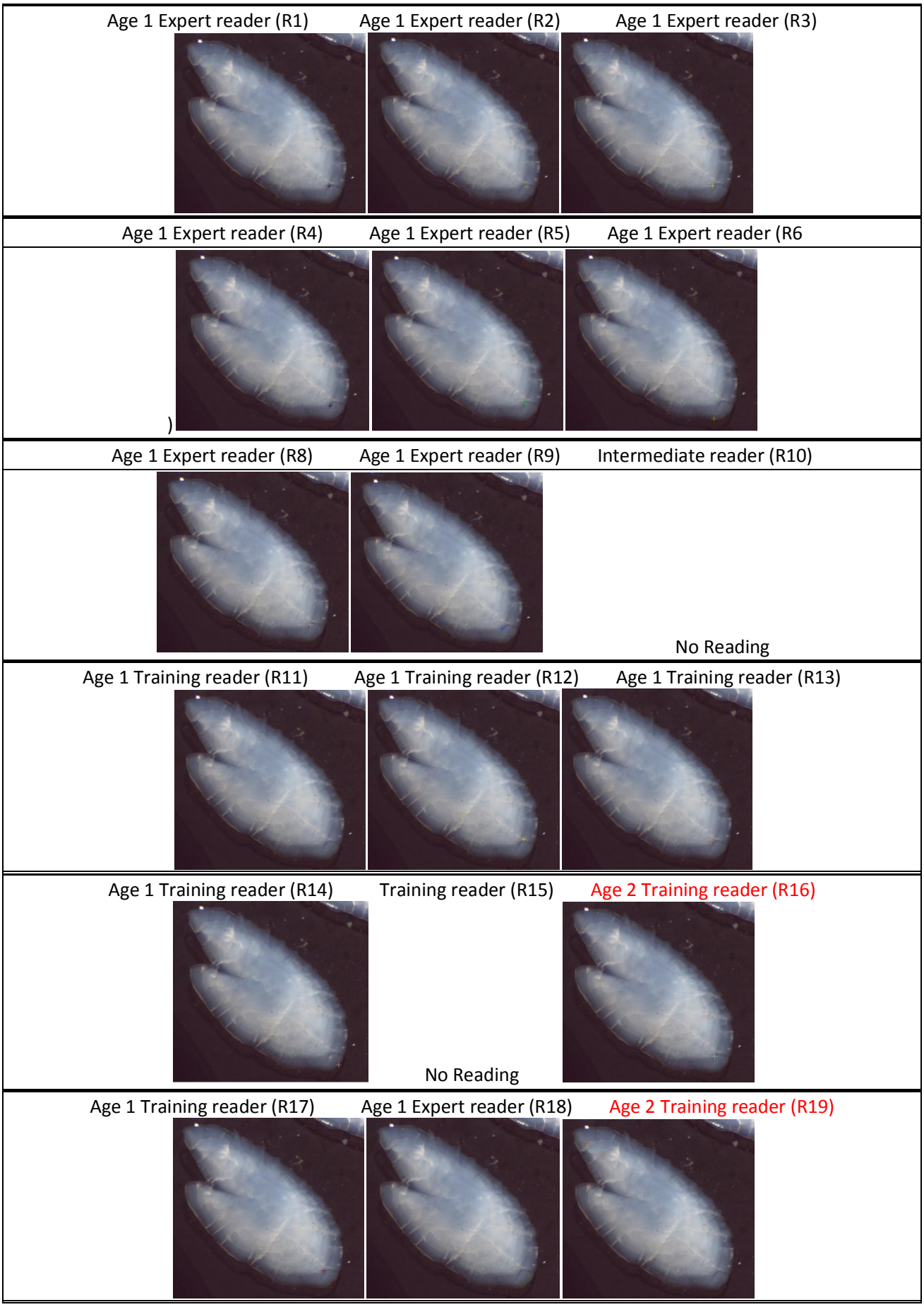


Figure 14. **ANE_GSA01 (Alboran Sea)**: Age Reading for anchovy 08082013-013.jpg, 13.7 cm, female, caught August 2013, **71% agreement Age 1 (Readings: 1 to 3 years).** Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

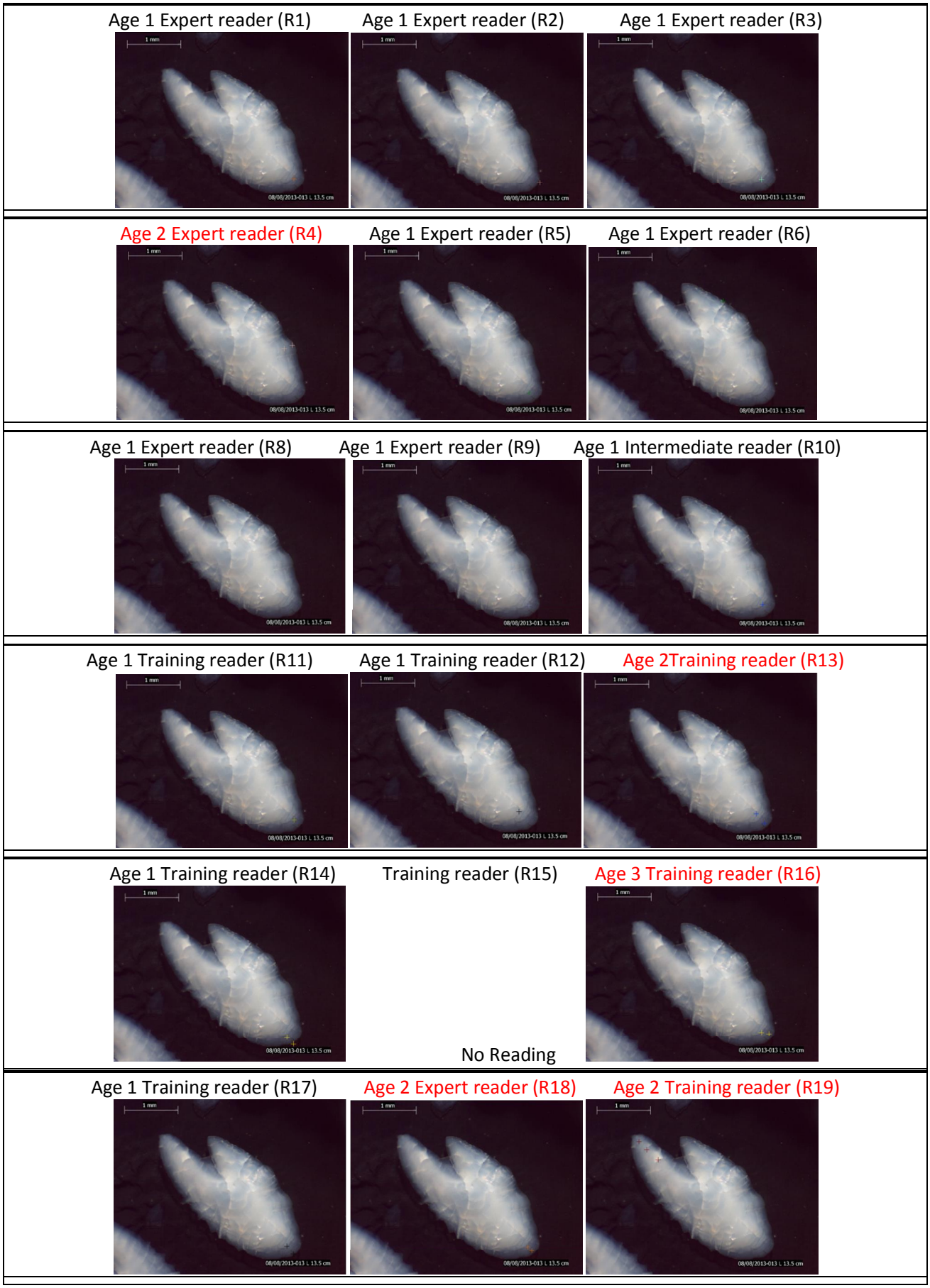


Figure 15. **ANE_GSA01 (Alboran Sea)**: Age Reading for anchovy 02052013-024.jpg, 14.6 cm, male, caught May 2013, **33% agreement Age 1** (Readings: 0 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

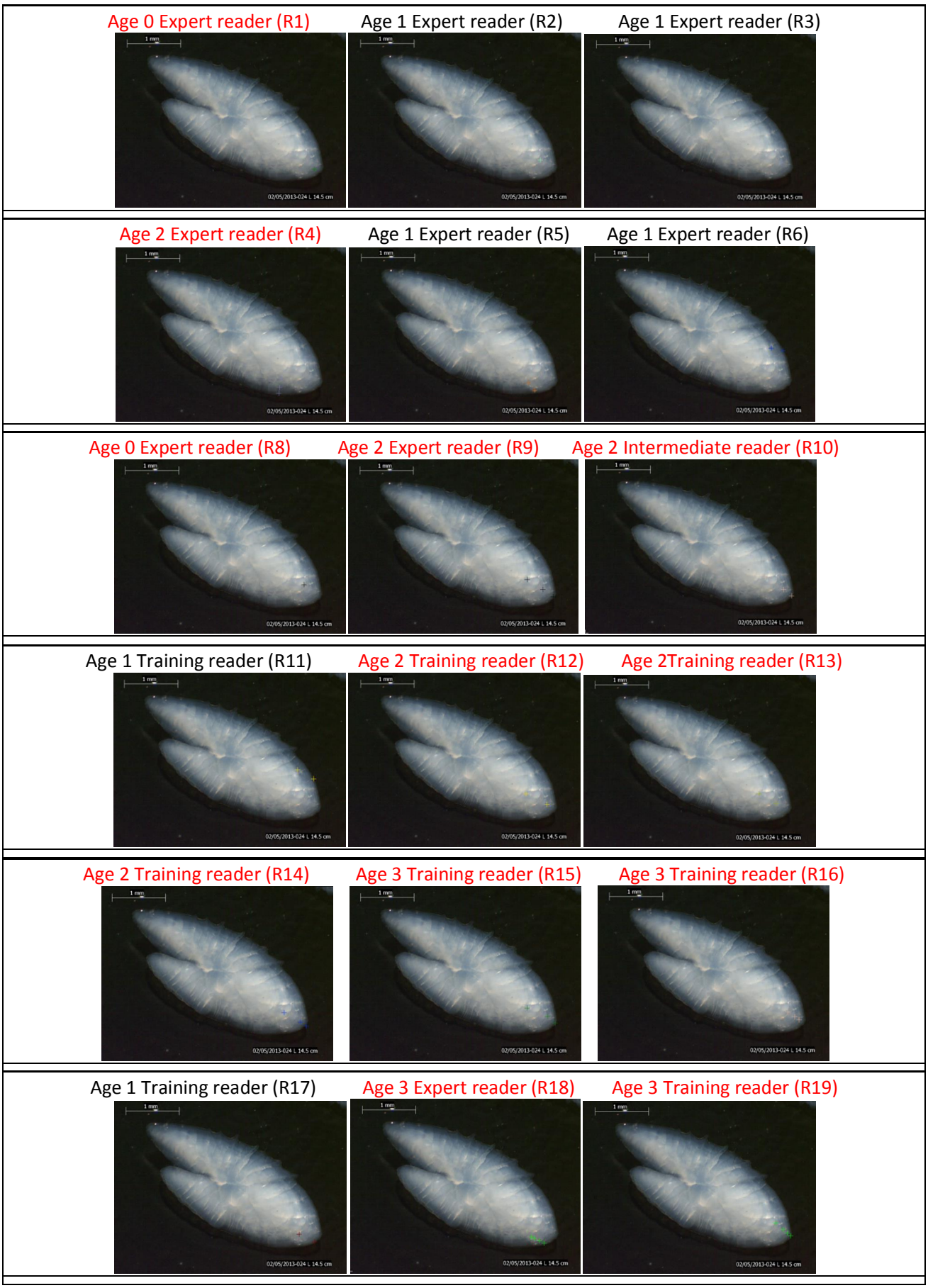
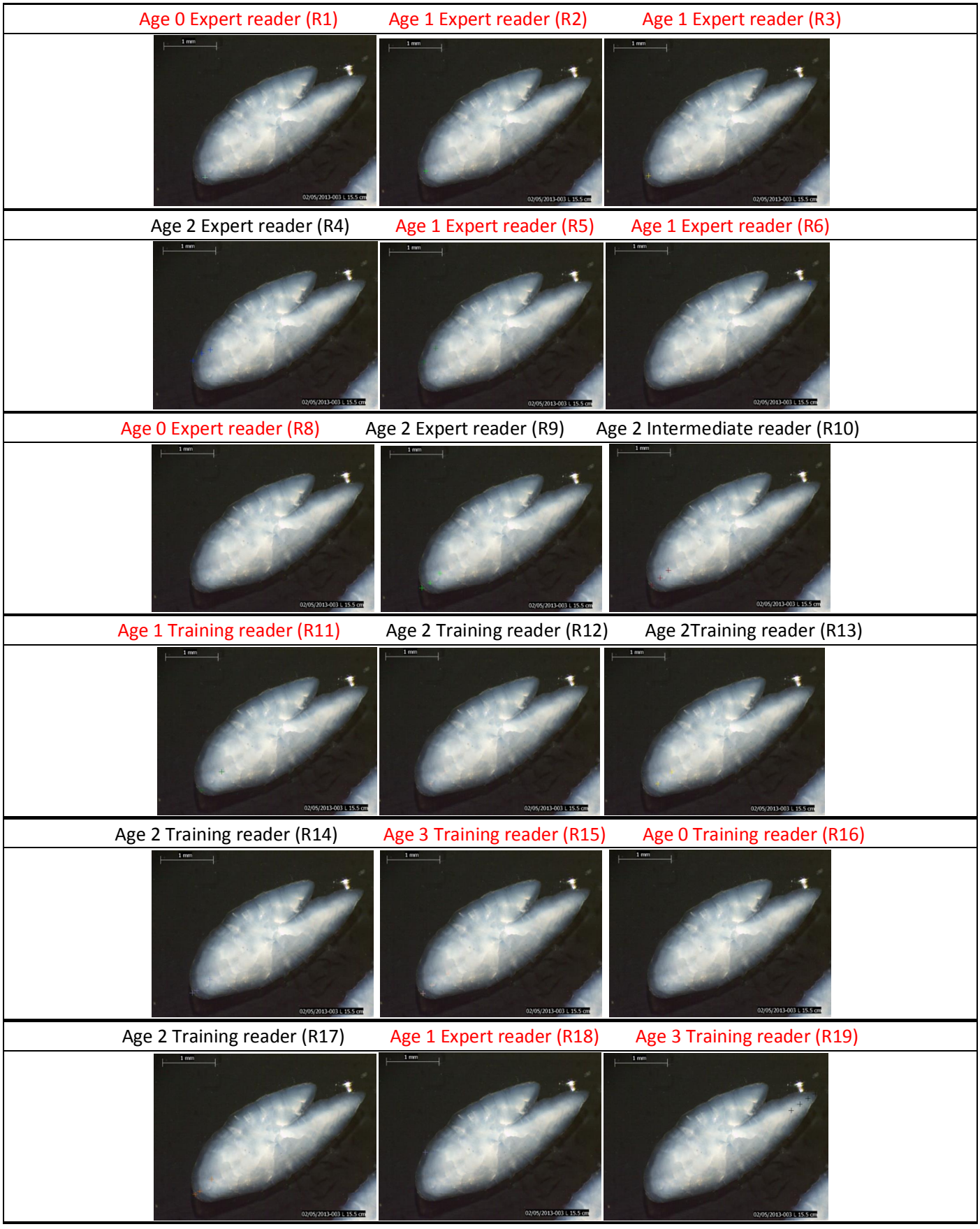


Figure 16. **ANE_GSA01 (Alboran Sea):** Age Reading for anchovy 02052013-003.jpg, 15.5 cm, male, caught May 2013, **39% agreement Age 2** (Readings: 0 to 3 years).). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 1 for expert readers** (56% agreement) **and age 1 for area reader** (only one reader).



Images of Western Mediterranean (ANE_GSA06)

Figures 17 to 20

Figure 17. **ANE_GSA06 (Western Mediterranean)**:: Age Reading for anchovy 1308013-033.jpg, 14.5 cm, female, caught August 2013, **83% agreement Age 2** (Readings: 1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

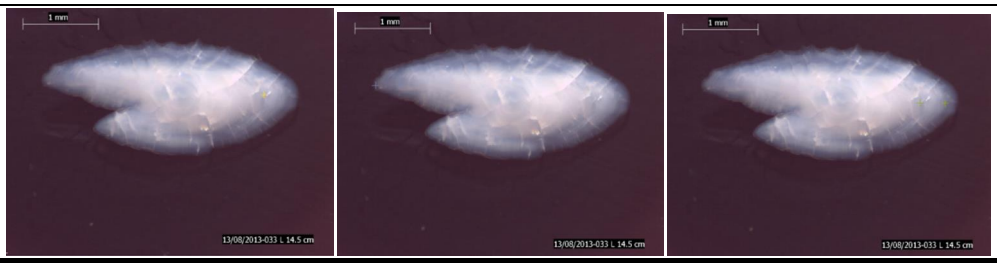
Age 1 Expert reader (R1)	Age 2 Expert reader (R2)	Age 2 Expert reader (R3)
		
Age 2 Expert reader (R4)	Age 2 Expert reader (R5)	Age 2 Expert reader (R6)
		
Age 2 Expert reader (R8)	Age 2 Expert reader (R9)	Age 2 Intermediate reader (R10)
		
Age 2 Training reader (R11)	Age 2 Training reader (R12)	Age 2 Training reader (R13)
		
Age 2 Training reader (R14)	Age 2 Training reader (R15)	Age 3 Training reader (R16)
		
Age 2 Training reader (R17)	Age 2 Expert reader (R18)	Age 3 Training reader (R19)
		

Figure 18. **ANE_GSA06 (Western Mediterranean)**: Age Reading for anchovy 1308013-008.jpg, 11.9 cm, female, caught August 2013, **72% agreement Age 1** (Readings: 0 to 2 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

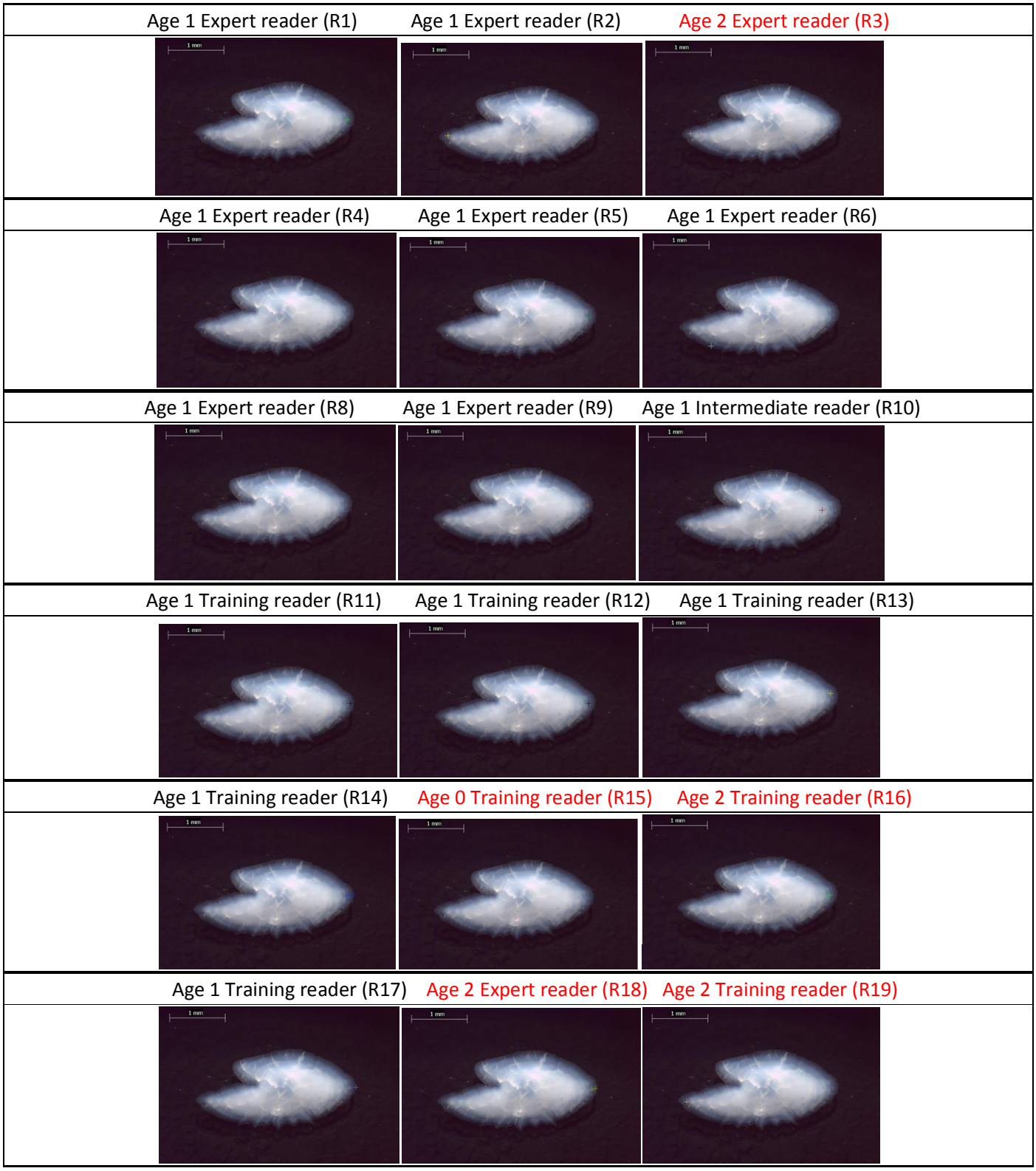


Figure 19. **ANE_GSA06 (Western Mediterranean):** Age Reading for anchovy 10042013-019.jpg, 13.2 cm, male, caught April 2013, **41% agreement Age 1** (Readings: 0 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

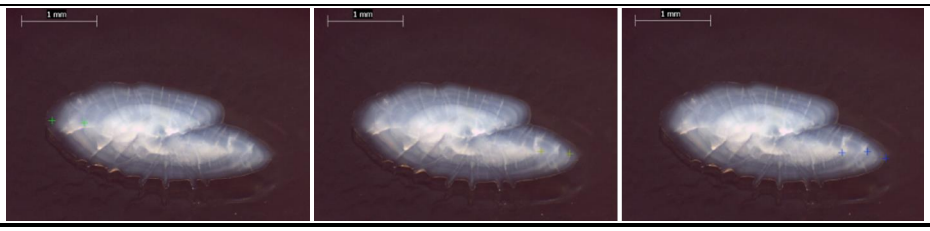
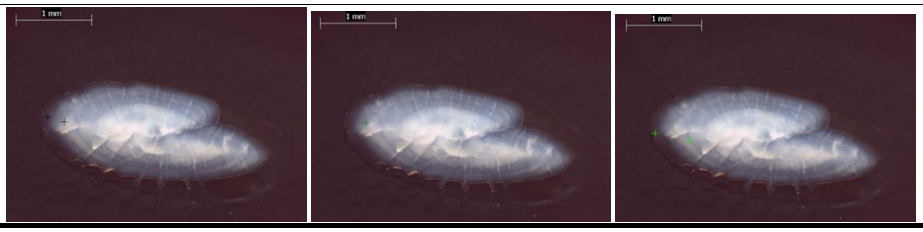
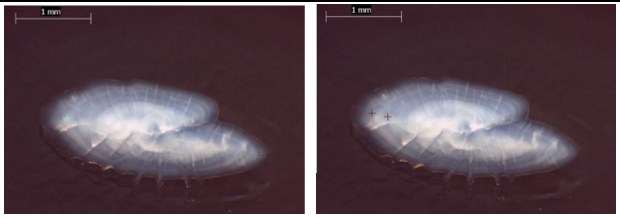
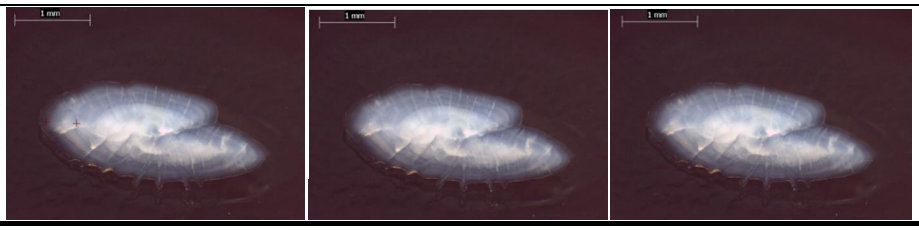
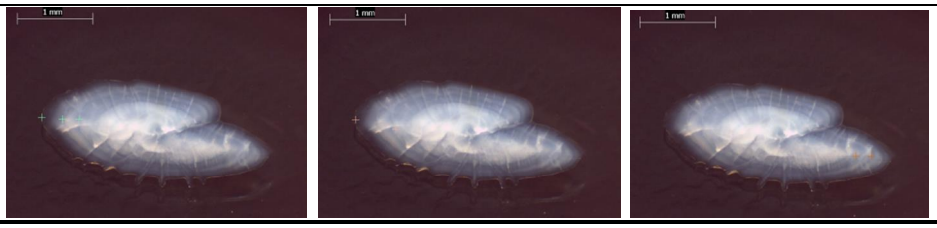
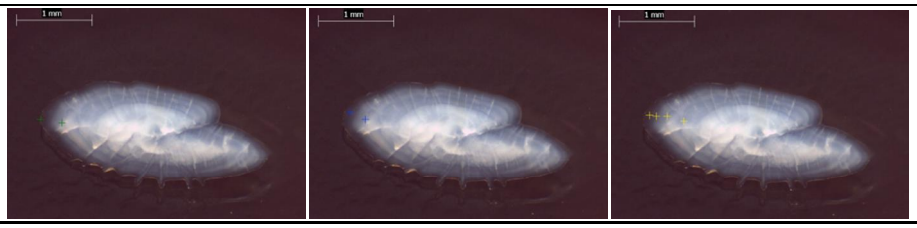
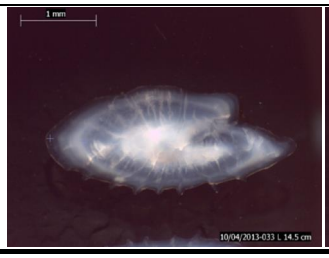
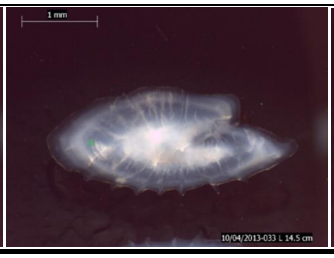
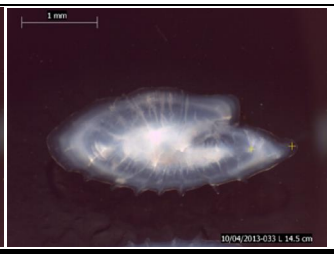
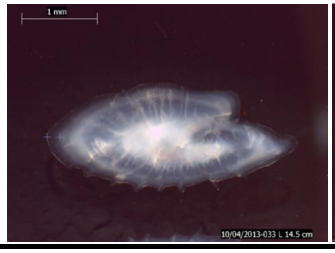
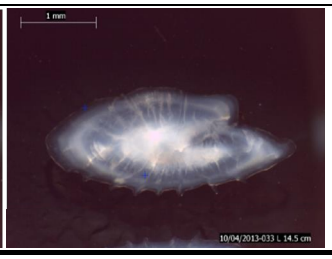
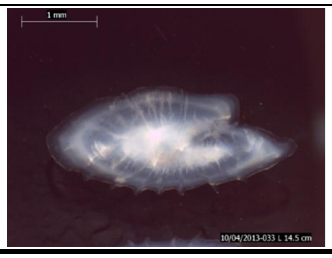
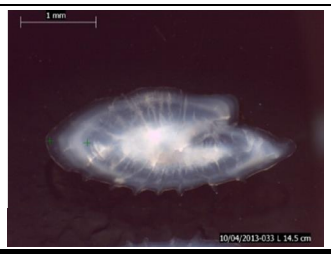
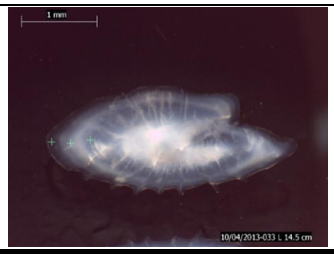
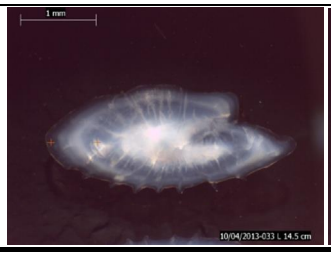
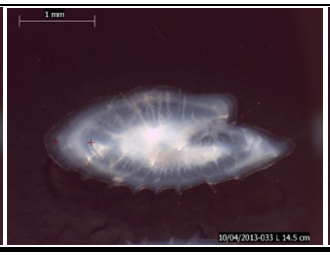
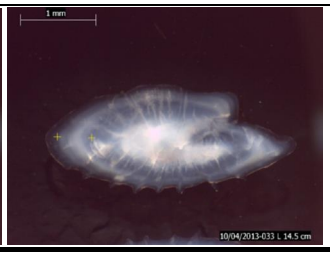
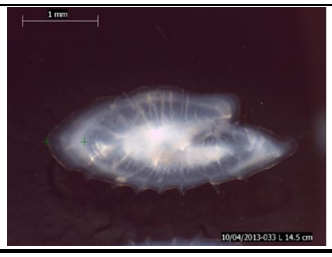
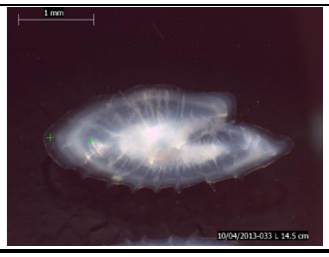
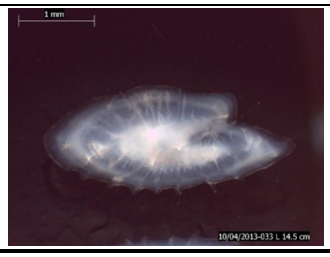
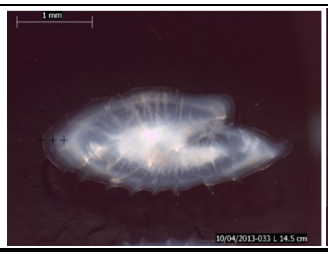
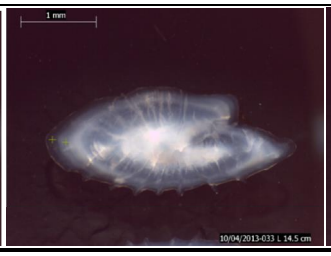
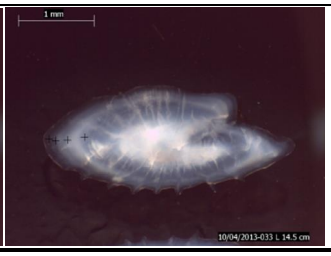
Age 1 Expert reader (R1)	Age 2 Expert reader (R2)	Age 3 Expert reader (R3)
		
Age 1 Expert reader (R4)	Age 0 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 0 Expert reader (R8)	Age 2 Expert reader (R9)	Age - Intermediate reader (R10)
		No reading
Age 1 Training reader (R11)	Age 1 Training reader (R12)	Age 1 Training reader (R13)
		
Age 2 Training reader (R14)	Age 2 Training reader (R15)	Age 2 Training reader (R16)
		
Age 1 Training reader (R17)	Age 2 Expert reader (R18)	Age 3 Training reader (R19)
		

Figure 20. **ANE_GSA06 (Western Mediterranean):** Age Reading for anchovy 10042013-033.jpg, 14.6 cm, female, caught April 2013, **50% agreement Age 2** (Readings: 0 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 1 for expert readers** (56% agreement) and **age 1 for area reader** (only one reader).

Age 1 Expert reader (R1)	Age 1 Expert reader (R2)	Age 2 Expert reader (R3)
		
Age 2 Expert reader (R4)	Age 1 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 0 Expert reader (R8)	Age 1 Expert reader (R9)	Age 2 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 2 Training reader (R12)	Age 2 Training reader (R13)
		
Age 1 Training reader (R14)	Age 2 Training reader (R15)	Age 2 Training reader (R16)
		
Age 2 Training reader (R17)	Age 2 Expert reader (R18)	Age 3 Training reader (R19)
		

Images of Gulf of Lion (ANE_GSA07)

Figures 21 to 24

Figure 21. **ANE_GSA07 (Gulf of Lion)**: Age Reading for anchovy EB_14_b20_O_0042.jpg, 14.0 cm, female, caught February 2014, **100% agreement Age 2** (Readings: 2 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

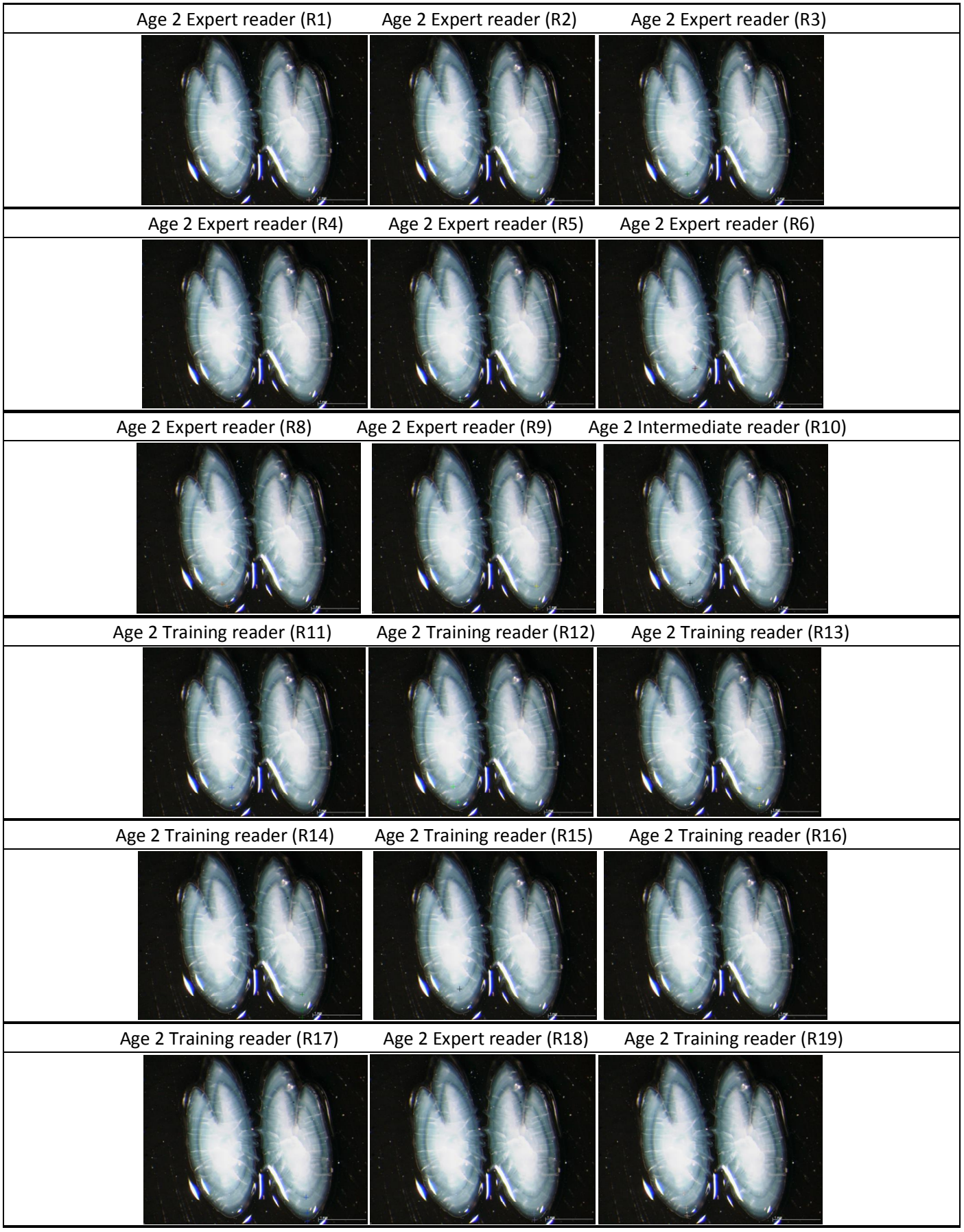


Figure 22. **ANE_GSA07 (Gulf of Lion)**: Age Reading for anchovy EB_14_b18_O_0176.jpg, 14.3 cm, female, caught July 2014, **61% agreement Age 1** (Readings: 1 to 3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

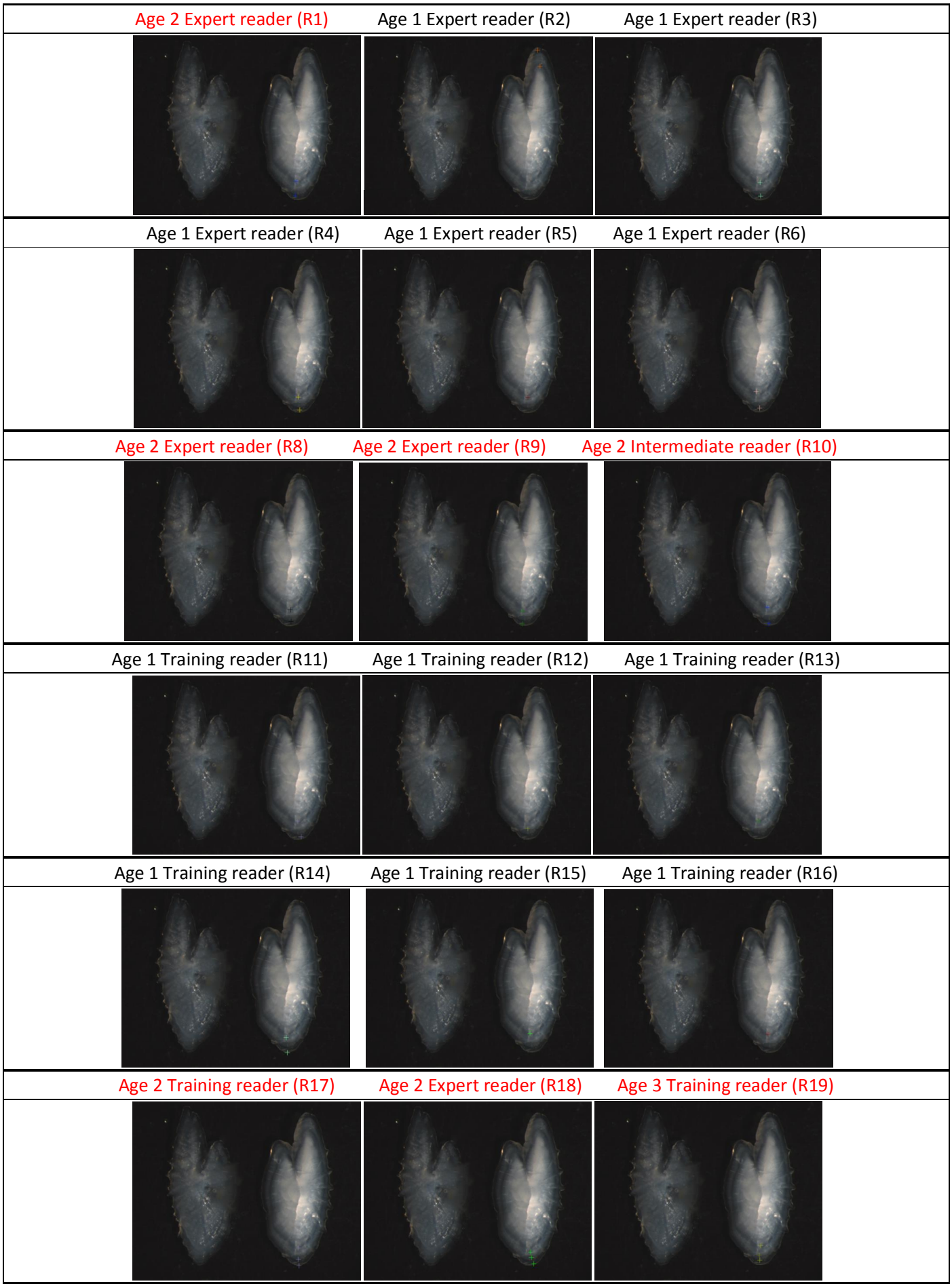
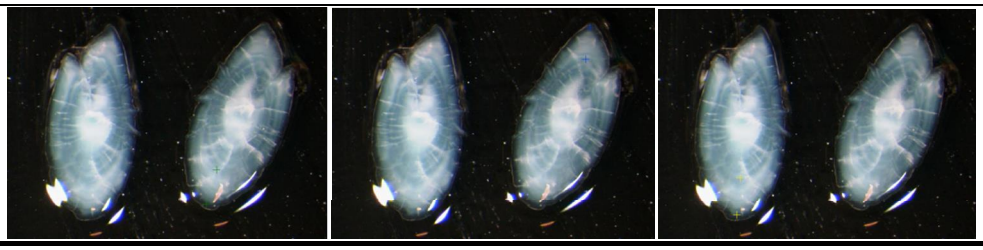
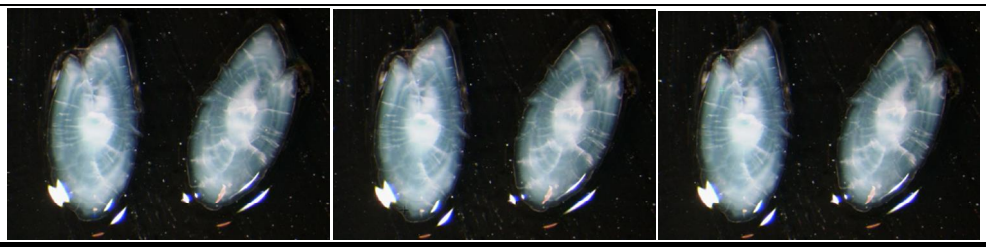
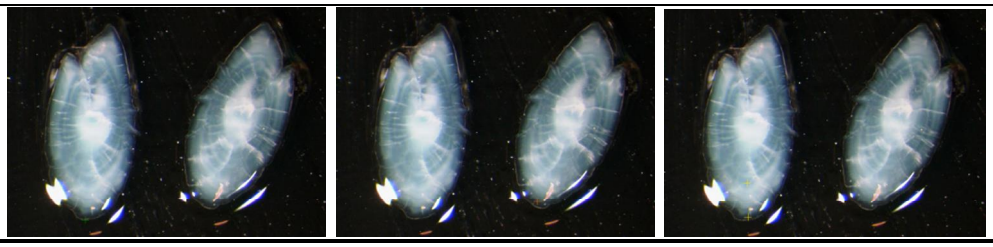
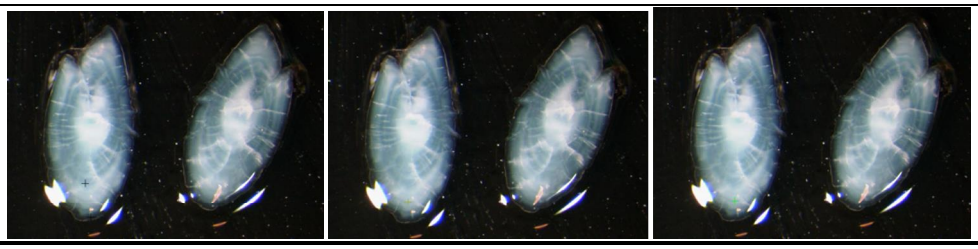
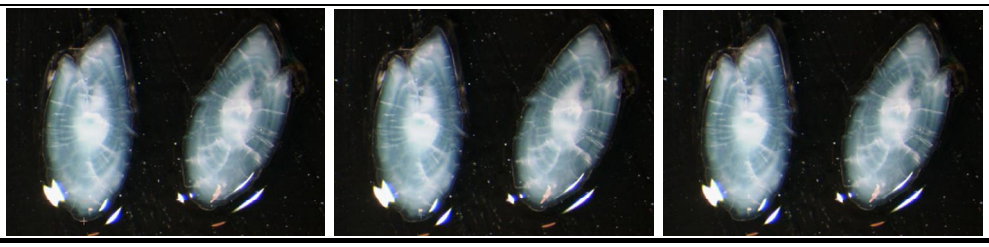
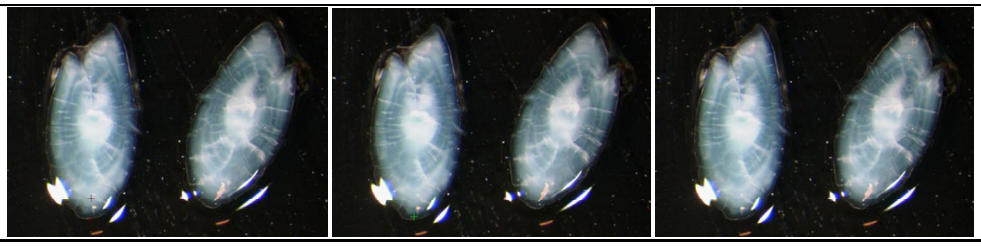


Figure 23. **ANE_GSA07 (Gulf of Lion)**: Age Reading for anchovy EB_14_b20_O_0074.jpg, 12.0 cm, female, caught February 2014, **44% agreement Age 2** (Readings:1 to 3 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age.

Age 3 Expert reader (R1)	Age 1 Expert reader (R2)	Age 3 Expert reader (R3)
		
Age 2 Expert reader (R4)	Age 1 Expert reader (R5)	Age 2 Expert reader (R6)
		
Age 2 Expert reader (R8)	Age 1 Expert reader (R9)	Age 1 Intermediate reader (R10)
		
Age 2 Training reader (R11)	Age 1 Training reader (R12)	Age 1 Training reader (R13)
		
Age 1 Training reader (R14)	Age 1 Training reader (R15)	Age 2 Training reader (R16)
		
Age 1 Training reader (R17)	Age 2 Expert reader (R18)	Age 2 Training reader (R19)
		

Figure 24. ANE_GSA07 (Gulf of Lion): Age Reading for anchovy EB_14_b20_O_0037.jpg, 11.0 cm, male, caught February 2014, **67% agreement Age 1** (Readings: 1-2 years). Conventional birthdates: 1st January; in red, readers who do not agree with the modal age. **Modal age 2 for expert readers** (56% agreement).

Age 2 Expert reader (R1)	Age 2 Expert reader (R2)	Age 2 Expert reader (R3)
		
Age 1 Expert reader (R4)	Age 1 Expert reader (R5)	Age 2 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 1 Expert reader (R9)	Age 1 Intermediate reader (R10)
		
Age 2 Training reader (R11)	Age 1 Training reader (R12)	Age 1 Training reader (R13)
		
Age 1 Training reader (R14)	Age 1 Training reader (R15)	Age 1 Training reader (R16)
		
Age 1 Training reader (R17)	Age 1 Expert reader (R18)	Age 2 Training reader (R19)
		

Images of Southern Tyrrhenian (ANE_GSA10)

Figures 25 to 29

Figure 25. **ANE_GSA10 (Southern Tyrrhenian)**: Age Reading for anchovy GSA10_09.jpg, 13.5 cm, male, caught August 2013, **89% agreement Age 2** (Readings:1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

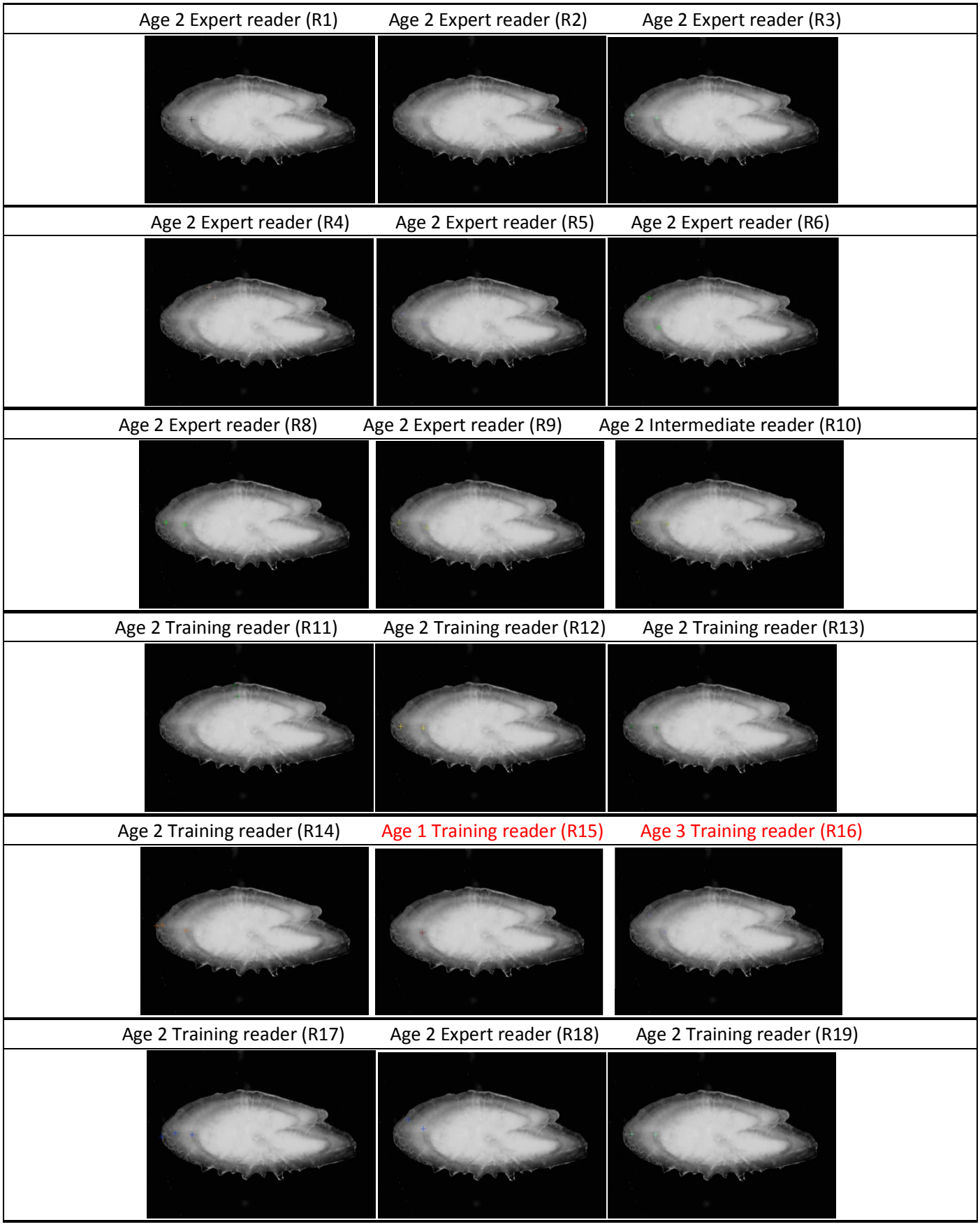


Figure 26. **ANE_GSA10 (Southern Tyrrhenian)**: Age Reading for anchovy GSA10_23.jpg, 8.0 cm, undefined, caught August 2012, **67% agreement Age 2** (Readings:0-1 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

Age 0 Expert reader (R1)	Age 1 Expert reader (R2)	Age 0 Expert reader (R3)
		
Age 0 Expert reader (R4)	Age 0 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 0 Expert reader (R9)	Age 0 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 0 Training reader (R12)	Age 0 Training reader (R13)
		
Age 0 Training reader (R14)	Age 0 Training reader (R15)	Age 1 Training reader (R16)
		
Age 0 Training reader (R17)	Age 1 Expert reader (R18)	Age 0 Training reader (R19)
		

Figure 27. **ANE_GSA10 (Southern Tyrrhenian)**: Age Reading for anchovy GSA10_14.jpg, 12.5 cm, female, caught September 2012, **39% agreement Age 1** (Readings: 1 to 4 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

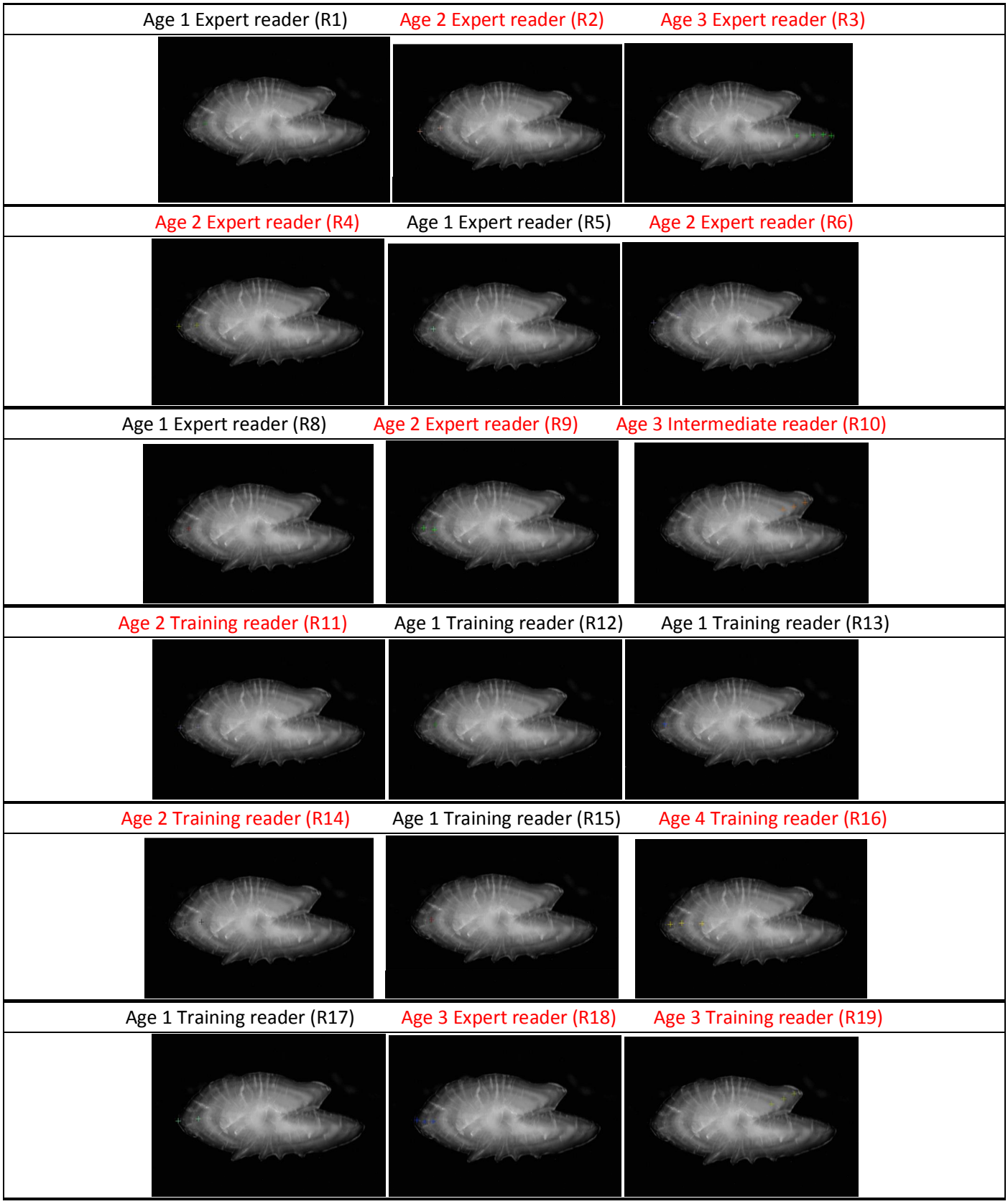


Figure 28. ANE_GSA10 (Southern Tyrrhenian): Age Reading for anchovy GSA10_53.jpg, 9.5 cm, female, caught May 2012, **56% agreement Age 0** (Readings: 0-1 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 1 for area readers** (100% agreement) and **modal age 0 for expert readers** (67% agreement).

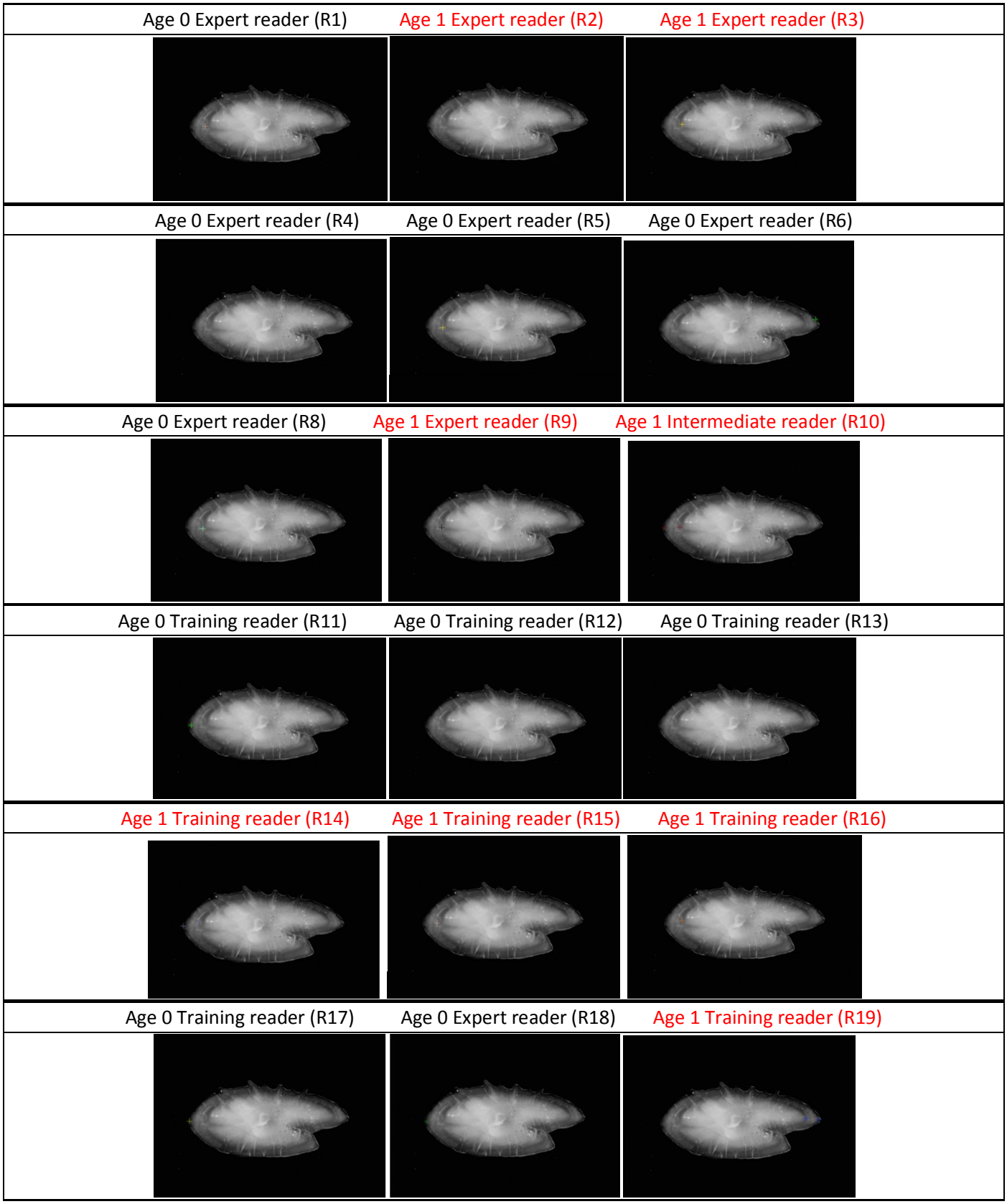
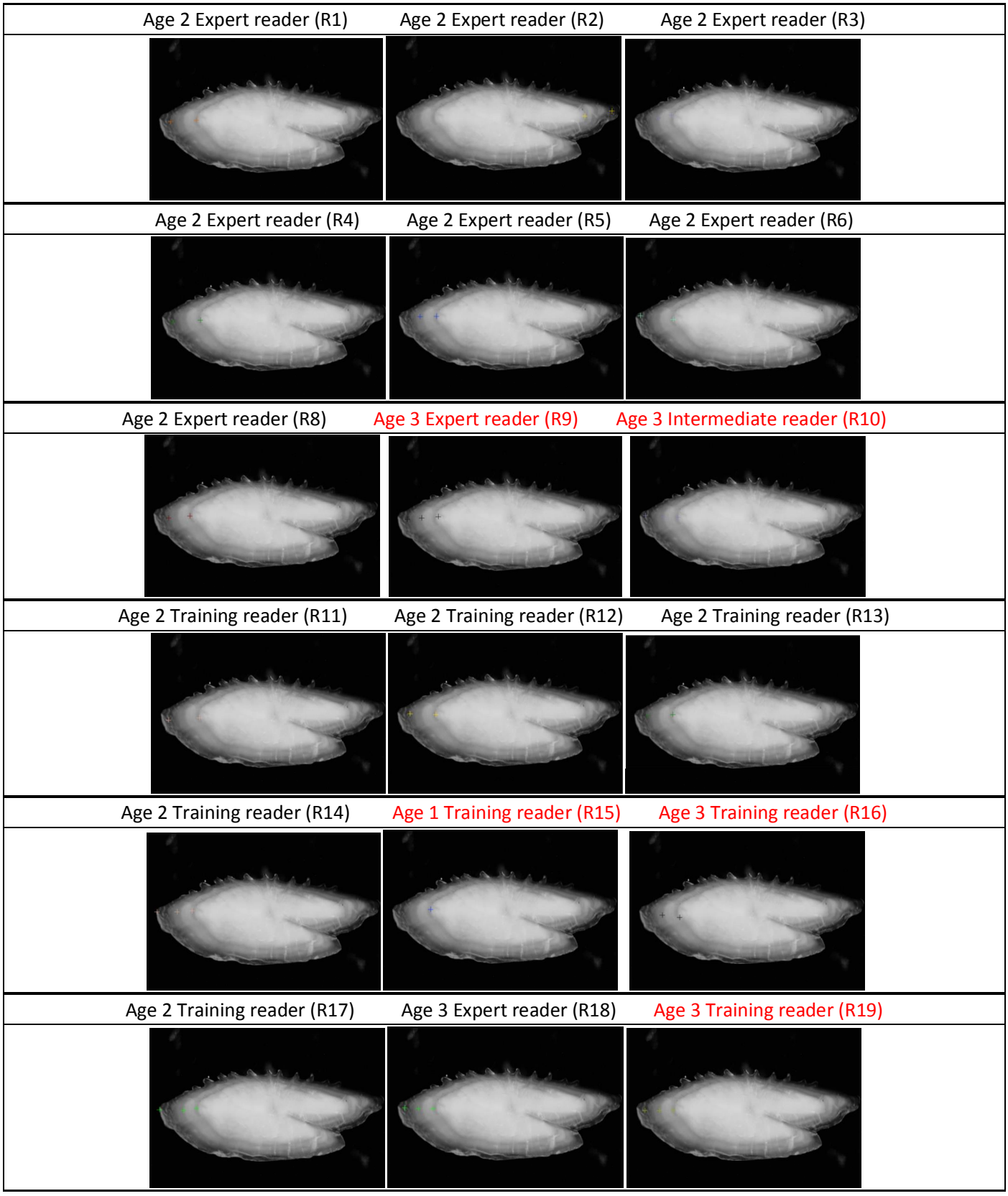


Figure 29. ANE_GSA10 (Southern Tyrrhenian): Age Reading for anchovy GSA10_10.jpg, 14.0 cm, male, caught August 2013, **67% agreement Age 2** (Readings: 1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 3 for area readers** (100% agreement) **and modal age 2 for expert readers** (78% agreement).



Images of Strait of Sicily (ANE_GSA16)

Figures 30 to 33

Figure 30. **ANE_GSA16 (Strait of Sicily)**: Age Reading for anchovy CB2010(10-5-10)_15(40x).jpg, 9.8 cm, undefined, caught May 2010, **94% agreement Age 0** (Readings: 0-1 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

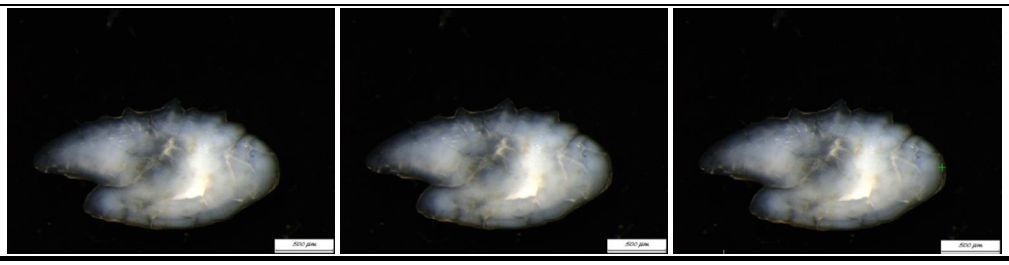
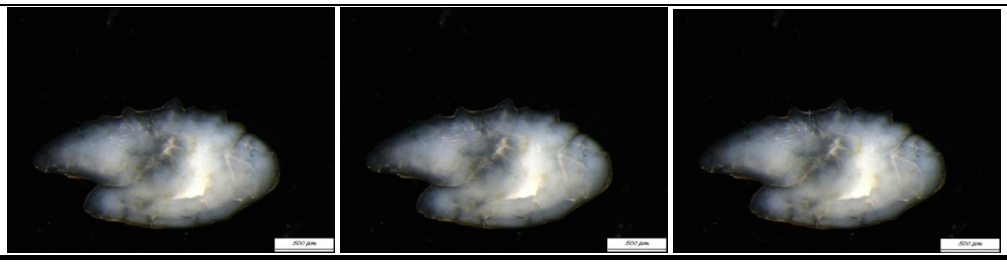
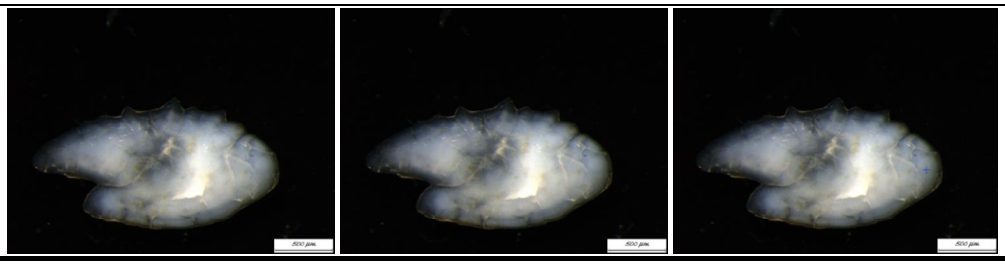
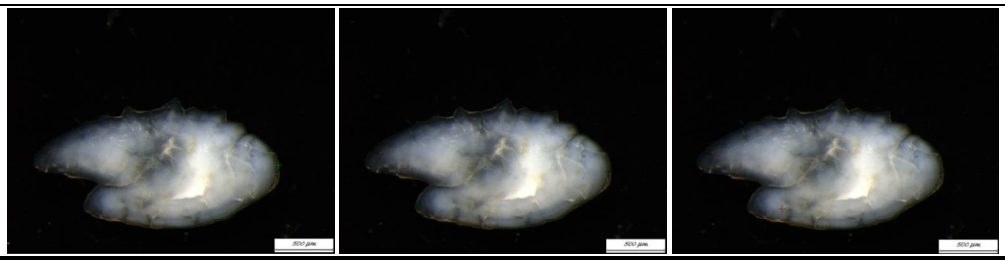
Age 0 Expert reader (R1)	Age 0 Expert reader (R2)	Age 1 Expert reader (R3)
		
Age 0 Expert reader (R4)	Age 0 Expert reader (R5)	Age 0 Expert reader (R6)
		
Age 0 Expert reader (R8)	Age 0 Expert reader (R9)	Age 0 Intermediate reader (R10)
		
Age 0 Training reader (R11)	Age 0 Training reader (R12)	Age 0 Training reader (R13)
		
Age 0 Training reader (R14)	Age 0 Training reader (R15)	Age 0 Training reader (R16)
		
Age 0 Training reader (R17)	Age 0 Expert reader (R18)	Age 0 Training reader (R19)
		

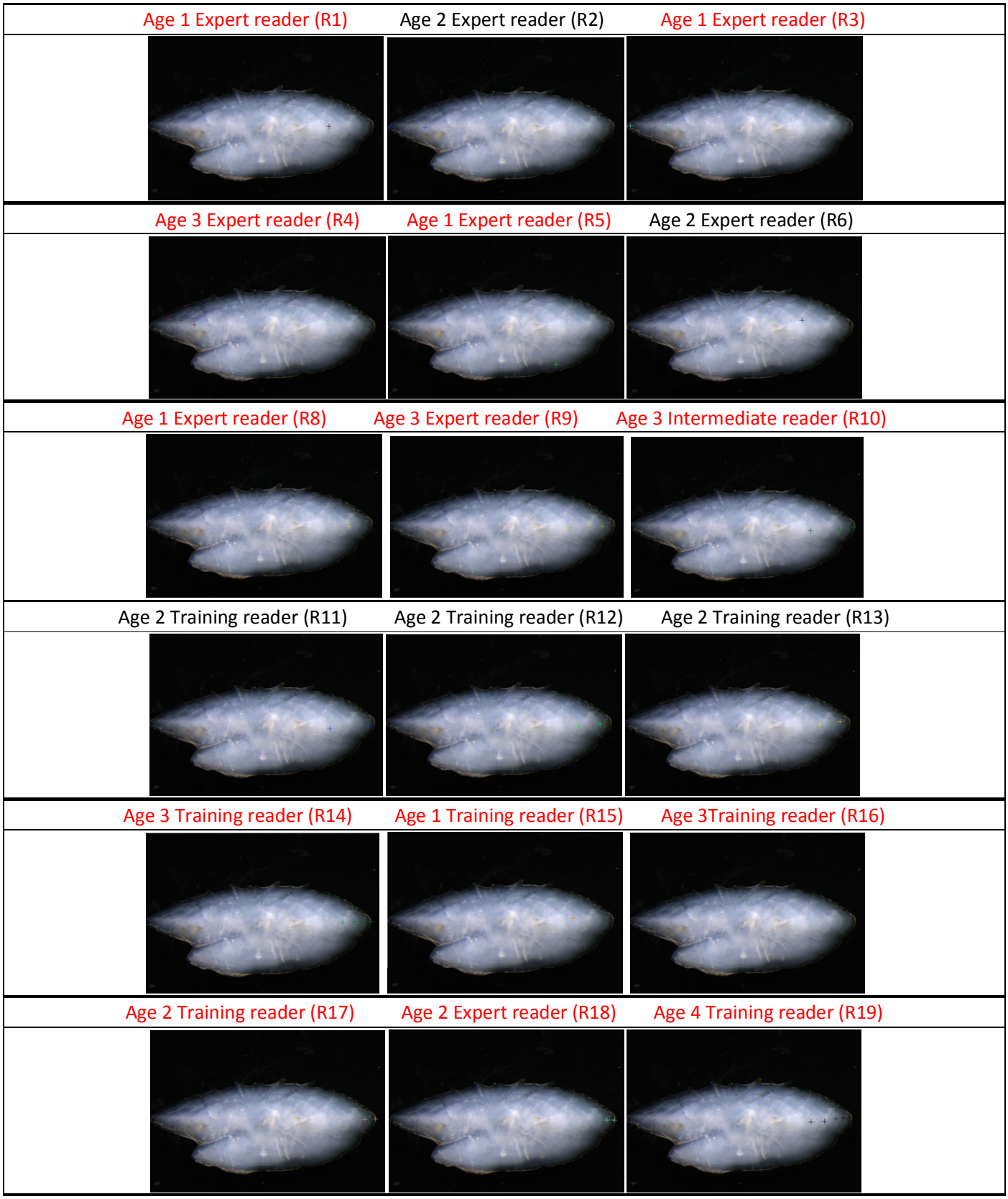
Figure 31. **ANE_GSA16 (Strait of Sicily)**: Age Reading for anchovy CB2010(13-4-10)_5(32x).jpg, 13.1 cm, male, caught April 2010, **72% agreement Age 1** (Readings: 0 to 2 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

Age 1 Expert reader (R1)	Age 1 Expert reader (R2)	Age 2 Expert reader (R3)
		
Age 1 Expert reader (R4)	Age 0 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 0 Expert reader (R8)	Age 1 Expert reader (R9)	Age 1 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 1 Training reader (R12)	Age 1 Training reader (R13)
		
Age 1 Training reader (R14)	Age 1 Training reader (R15)	Age 1Training reader (R16)
		
Age 1 Training reader (R17)	Age 2 Expert reader (R18)	Age 2 Training reader (R19)
		

Figure 32. **ANE_GSA16 (Strait of Sicily)**: Age Reading for anchovy CB2010(6-9-10)_2(32x).jpg, 14.6 cm, male, caught September 2010, **39% agreement Age 2** (Readings: 1 to 4 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

Age 1 Expert reader (R1)	Age 2 Expert reader (R2)	Age 1 Expert reader (R3)
		
Age 2 Expert reader (R4)	Age 1 Expert reader (R5)	Age 2 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 3 Expert reader (R9)	Age 3 Intermediate reader (R10)
		
Age 2 Training reader (R11)	Age 1 Training reader (R12)	Age 3 Training reader (R13)
		
Age 2 Training reader (R14)	Age 1 Training reader (R15)	Age 3Training reader (R16)
		
Age 1 Training reader (R17)	Age 4 Expert reader (R18)	Age 4 Training reader (R19)
		

Figure 33. ANE_GSA16 (Strait of Sicily): Age Reading for anchovy CB2010(6-9-10)_1(32x).jpg, 14.7 cm, male, caught September 2010, **39% agreement Age 2** (Readings: 1 to 4 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 3 for area readers** (50%% agreement) **and modal age 1 for expert readers** (44% agreement).



Images of Western Ionian (ANE_GSA19)

Figures 34 to 38

Figure 34. **ANE_GSA19 (Western Ionian)**: Age Reading for anchovy GSA19_35.jpg, 13.0 cm, female, caught May 2012, **83% agreement Age 1** (Readings: 1-2 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

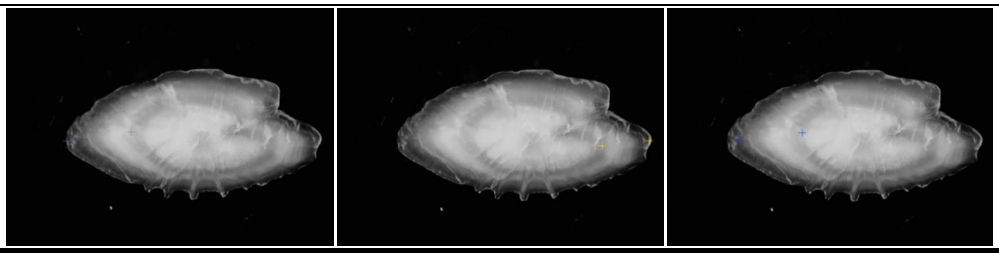
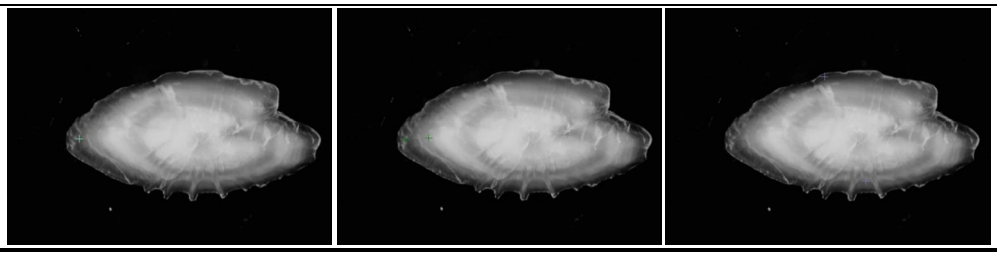
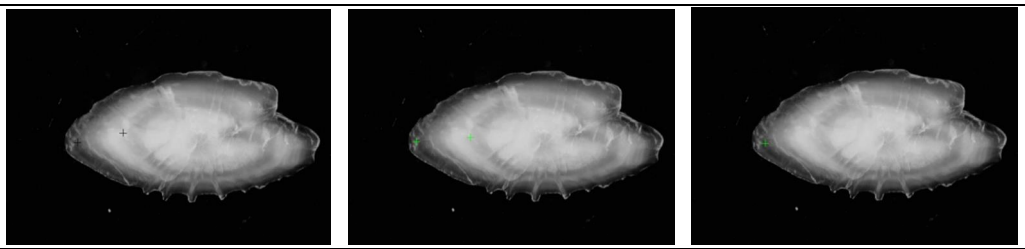
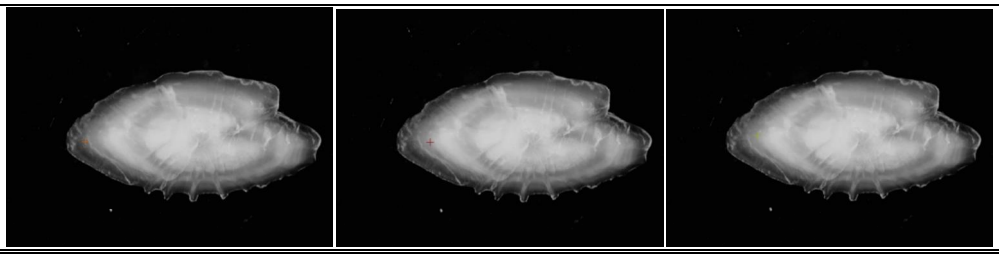
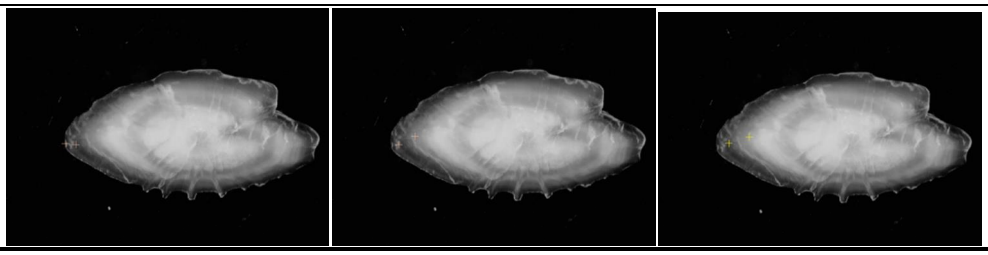
Age 2 Expert reader (R1)	Age 1 Expert reader (R2)	Age 2 Expert reader (R3)
		
Age 1 Expert reader (R4)	Age 1 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 1 Expert reader (R9)	Age 1 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 1 Training reader (R12)	Age 1 Training reader (R13)
		
Age 1 Training reader (R14)	Age 1 Training reader (R15)	Age 1Training reader (R16)
		
Age 1 Training reader (R17)	Age 2 Expert reader (R18)	Age 1 Training reader (R19)
		

Figure 35. **ANE_GSA19 (Western Ionian)**: Age Reading for anchovy GSA19_11.jpg, 8.5 cm, undefined, caught September 2013, **72% agreement Age 0** (Readings: 0-1 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

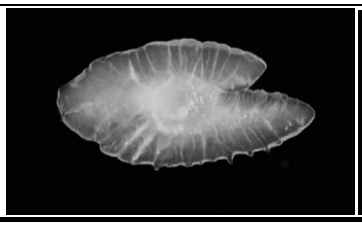
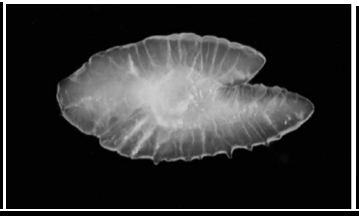
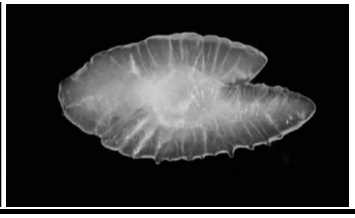
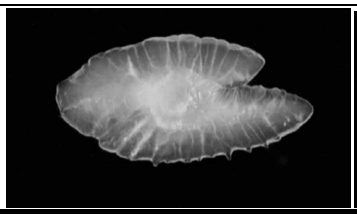
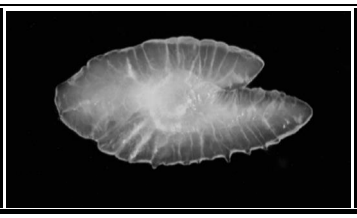
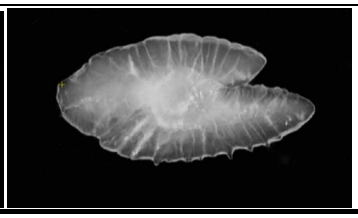
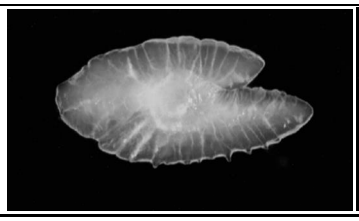
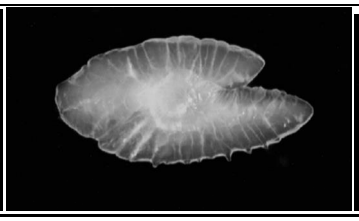
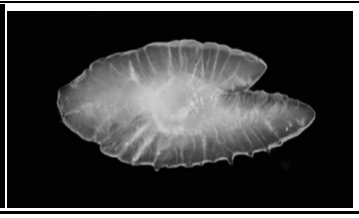
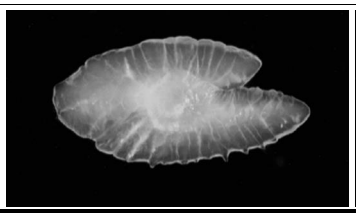
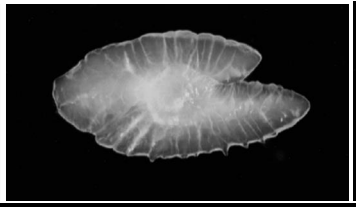
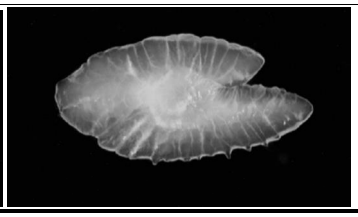
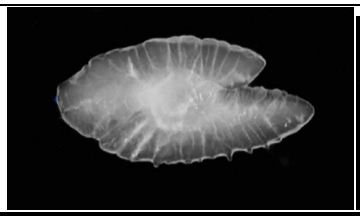
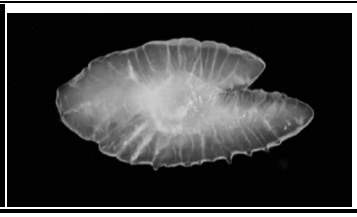
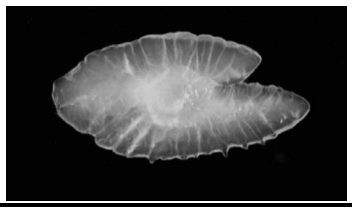
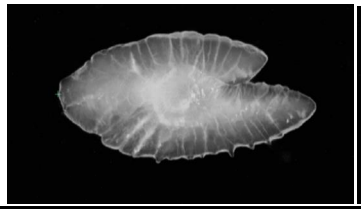
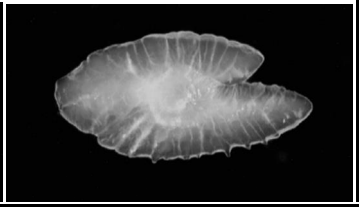
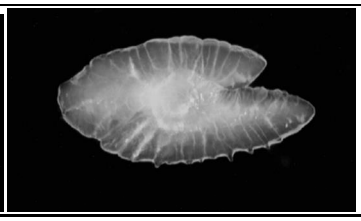
Age 0 Expert reader (R1)	Age 1 Expert reader (R2)	Age 0Expert reader (R3)
		
Age 0 Expert reader (R4)	Age 0 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 0 Expert reader (R9)	Age 0 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 0 Training reader (R12)	Age 0Training reader (R13)
		
Age 0 Training reader (R14)	Age 0 Training reader (R15)	Age 1Training reader (R16)
		
Age 0 Training reader (R17)	Age 0 Expert reader (R18)	Age 0 Training reader (R19)
		

Figure 36. **ANE_GSA19 (Western Ionian)**: Age Reading for anchovy GSA19_03.jpg, 11.5 cm, female, caught August 2013, **44% agreement Age 1** (Readings: 1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age.

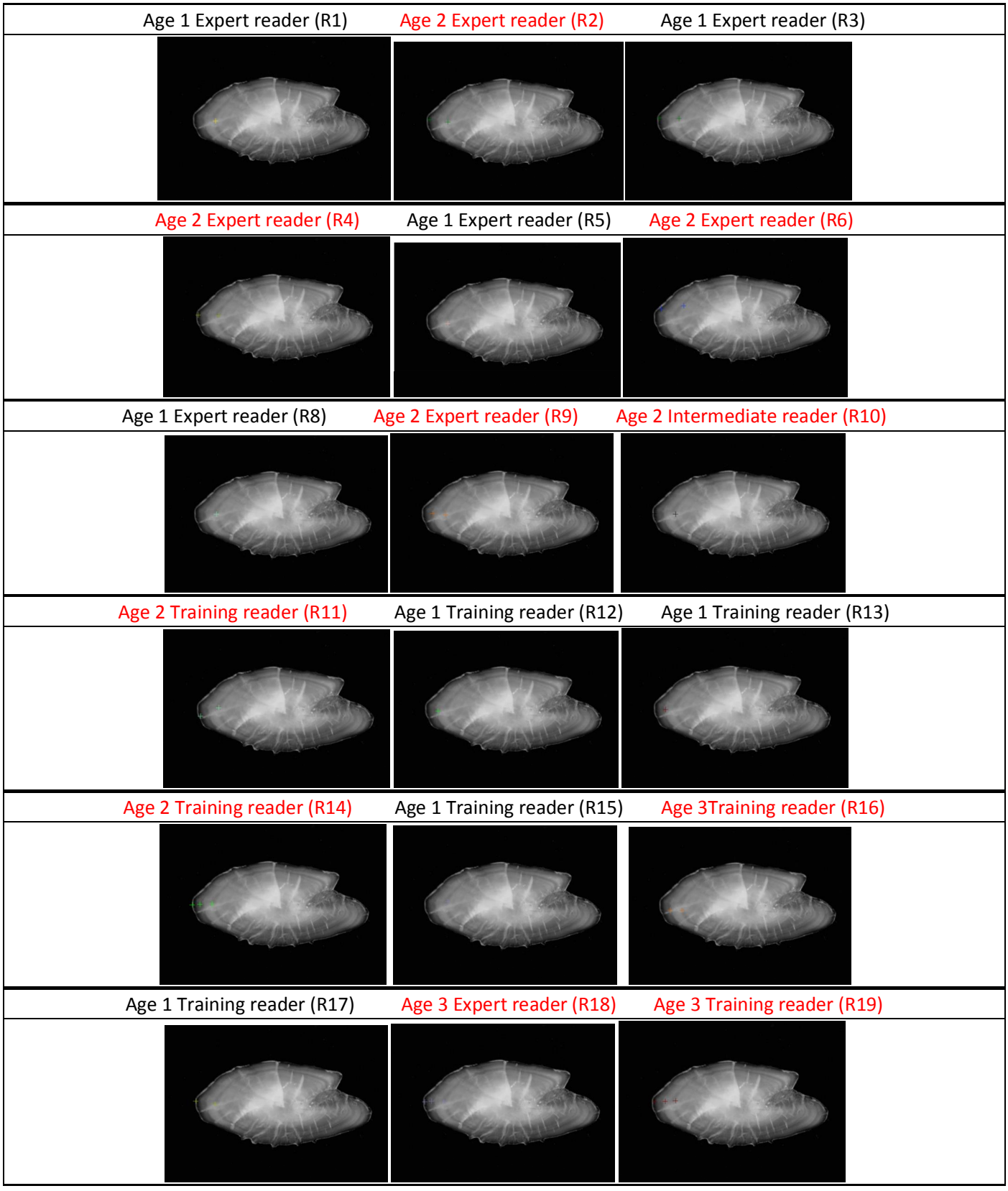
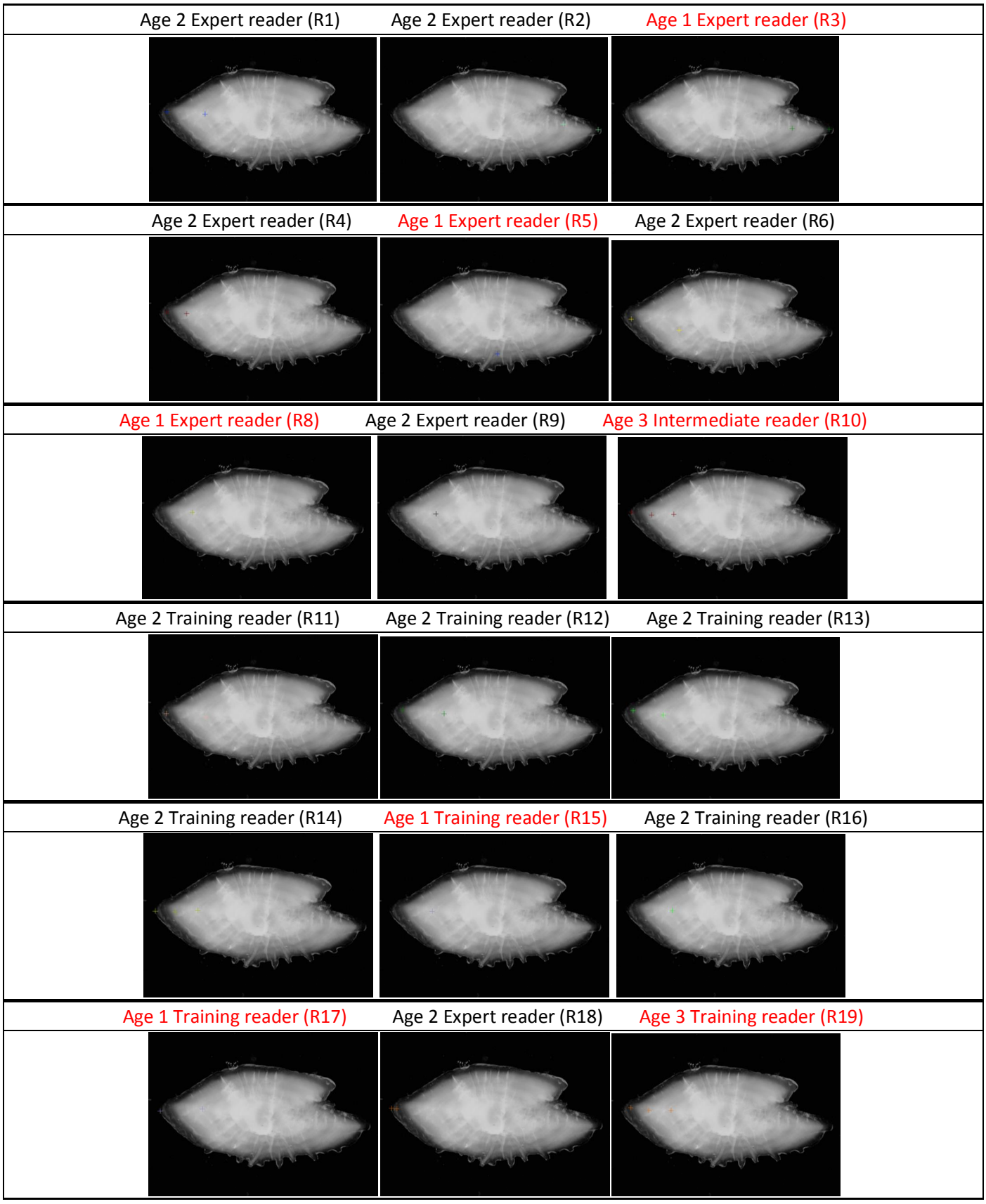


Figure 37. **ANE_GSA19 (Western Ionian)**: Age Reading for anchovy GSA19_28.jpg, 13.5 cm, female, caught September 2012, **50% agreement Age 2** (Readings: 1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 2 for area readers** (33% agreement) **and modal age 1 for expert readers** (67% agreement).

Age 1 Expert reader (R1)	Age 1 Expert reader (R2)	Age 1 Expert reader (R3)
		
Age 2 Expert reader (R4)	Age 1 Expert reader (R5)	Age 2 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 1 Expert reader (R9)	Age 2 Intermediate reader (R10)
		
Age 2 Training reader (R11)	Age 2 Training reader (R12)	Age 2 Training reader (R13)
		
Age 2 Training reader (R14)	Age 1 Training reader (R15)	Age 3Training reader (R16)
		
Age 2 Training reader (R17)	Age 2 Expert reader (R18)	Age 3 Training reader (R19)
		

Figure 38. **ANE_GSA19 (Western Ionian)**: Age Reading for anchovy GSA19_04.jpg, 13.5 cm, male, caught August 2013, **61% agreement Age 2** (Readings: 1 to 3 years). Conventional birthdates: 1st July; in red, readers who do not agree with the modal age. **Modal age 3 for area readers** (67% agreement) and **modal age 2 for expert readers** (67% agreement).



Images of Aegean Sea (ANE_GSA22)

Figures 39 to 42

Figure 39. **ANE_GSA22 (Aegean Sea)**: Age Reading for anchovy ANE20062014_1_20.jpg, 9.5 cm, female, caught June 2014, **83% agreement Age 1** (Readings: 0 to 2 years). Conventional birthdates: 1st June; in red, readers who do not agree with the modal age.

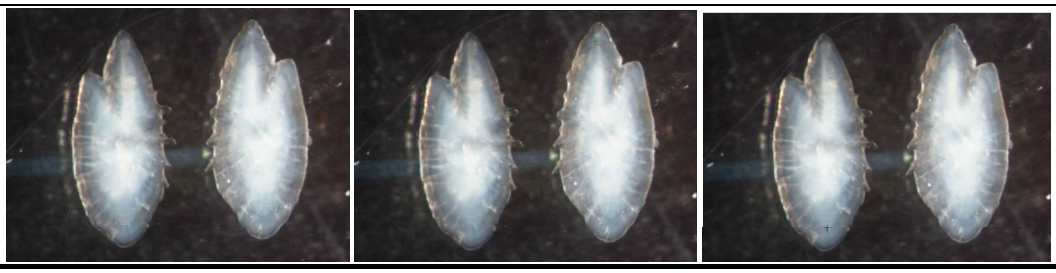
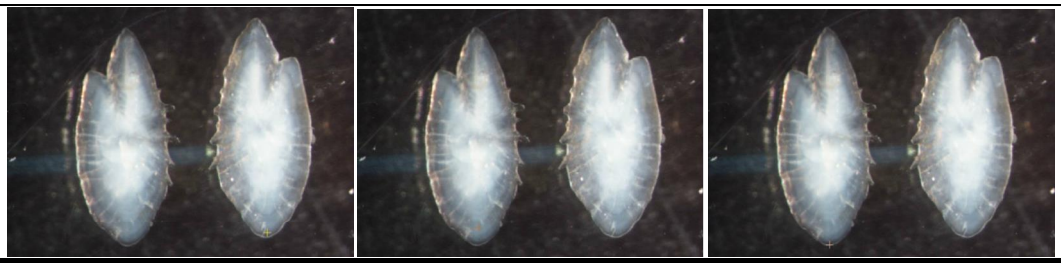
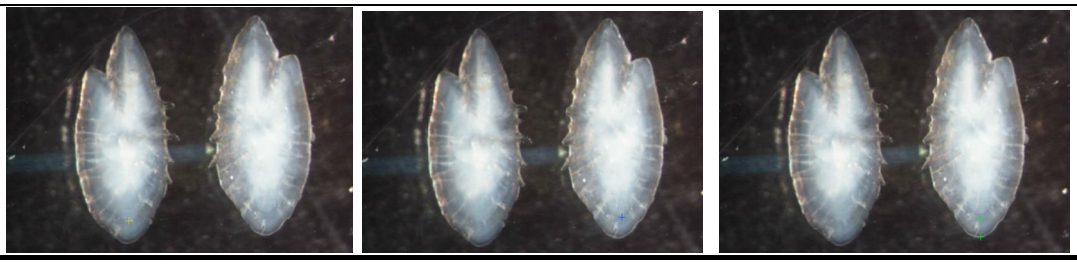
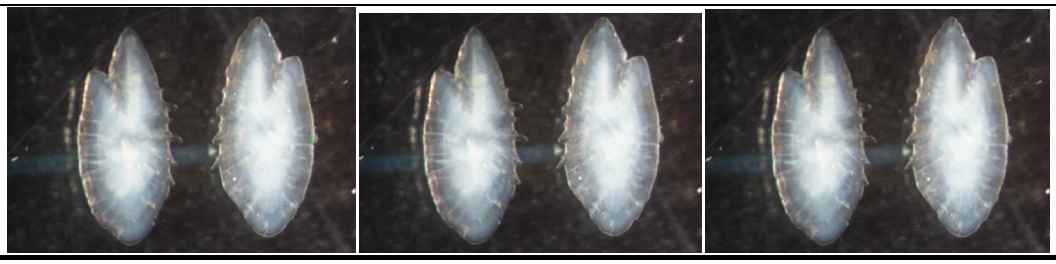
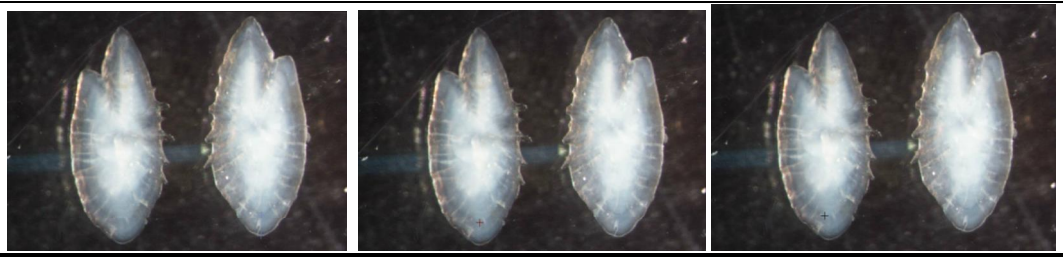
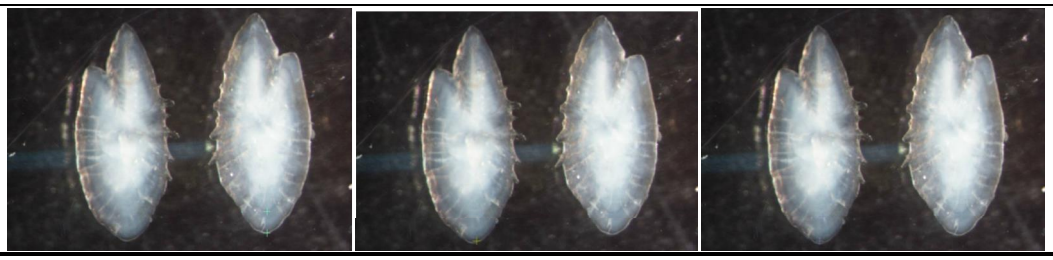
Age 1 Expert reader (R1)	Age 1 Expert reader (R2)	Age 1 Expert reader (R3)
		
Age 1 Expert reader (R4)	Age 1 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 1 Expert reader (R9)	Age 1 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 0 Training reader (R12)	Age 0 Training reader (R13)
		
Age 1 Training reader (R14)	Age 1 Training reader (R15)	Age 2 Training reader (R16)
		
Age 1 Training reader (R17)	Age 1 Expert reader (R18)	Age 1 Training reader (R19)
		

Figure 40. **ANE_GSA22 (Aegean Sea)**: Age Reading for anchovy ANE25092014_4_08.jpg, 12.6 cm, female, caught September 2014, **72% agreement Age 1** (Readings: 1- 2 years). Conventional birthdates: 1st June; in red, readers who do not agree with the modal age.

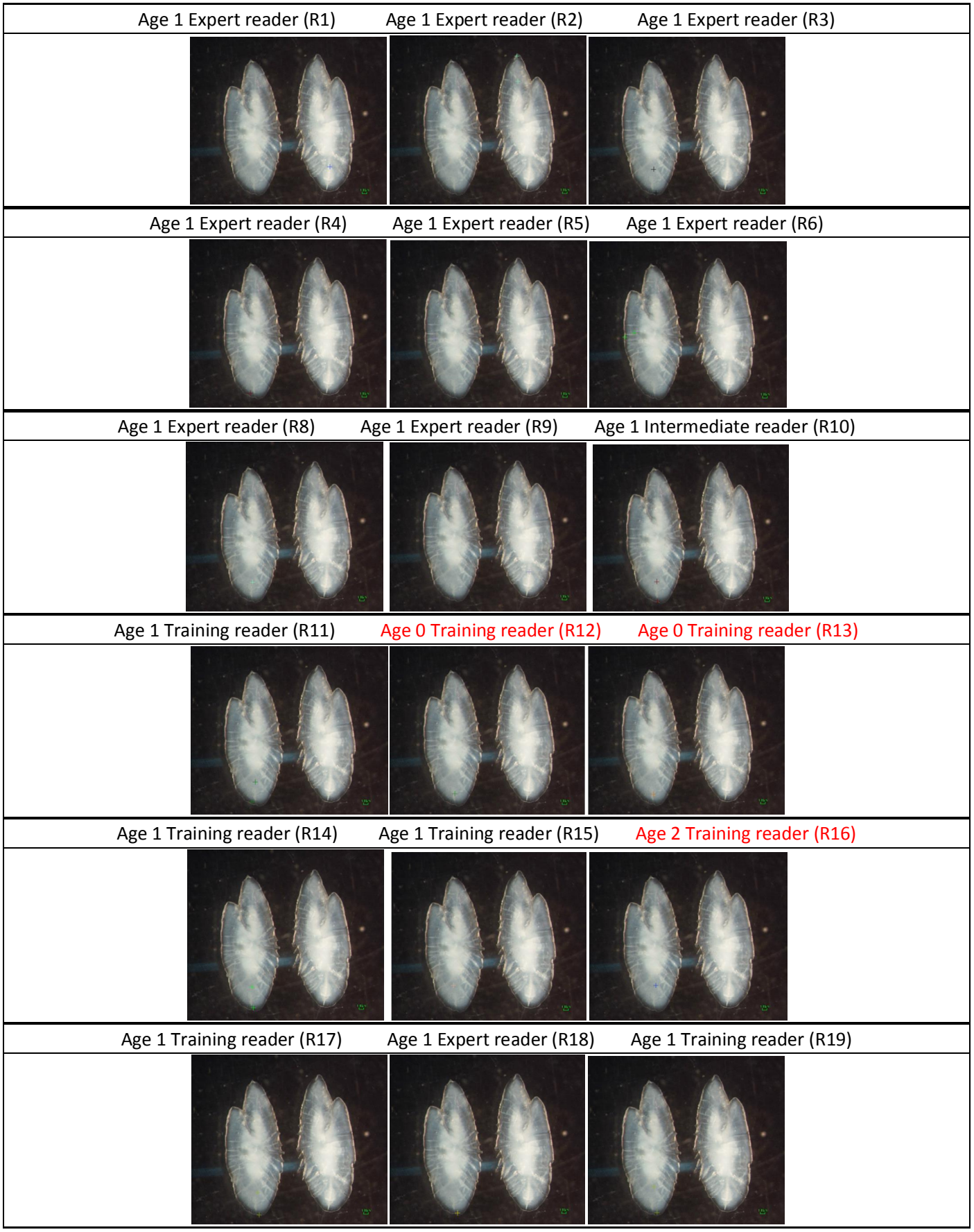


Figure 41. **ANE_GSA22 (Aegean Sea)**: Age Reading for anchovy ANE20062014_1_49.jpg, 9.0 cm, male, caught June 2014, **50% agreement Age 0** (Readings: 0-1 years). Conventional birthdates: 1st June; in red, readers who do not agree with the modal age.

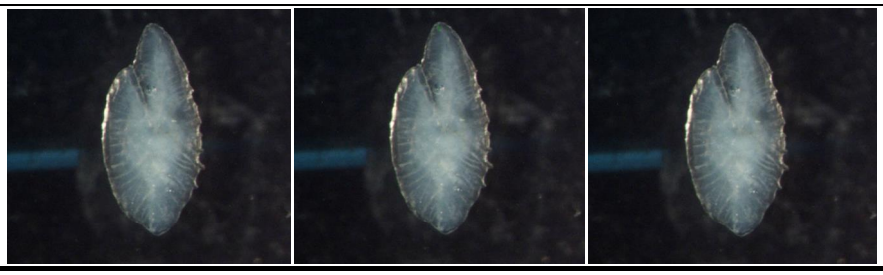
Age 0 Expert reader (R1)	Age 1 Expert reader (R2)	Age 0 Expert reader (R3)
		
Age 0 Expert reader (R4)	Age 1 Expert reader (R5)	Age 1 Expert reader (R6)
		
Age 1 Expert reader (R8)	Age 1 Expert reader (R9)	Age 0 Intermediate reader (R10)
		
Age 1 Training reader (R11)	Age 1 Training reader (R12)	Age 0 Training reader (R13)
		
Age 0 Training reader (R14)	Age 1 Training reader (R15)	Age 1 Training reader (R16)
		
Age 0 Training reader (R17)	Age 0 Expert reader (R18)	Age 0 Training reader (R19)
		

Figure 41. **ANE_GSA22 (Aegean Sea)**: Age Reading for anchovy ANE20062014_1_18.jpg, 10.5 cm, male, caught June 2014, **72% agreement Age 1** (Readings: 0-1 years). Conventional birthdates: 1st June; in red, readers who do not agree with the modal age. **Modal age 0 for area readers** (100% agreement) **and modal age 1 for expert readers** (78% agreement).